Winners of Sayre 'Free-for-All' In Kelvinator 'Derby' Get Prizes

(Concluded from Page 1, Column 5)

W. Va., were tied for first on the Belmont oval as the first furlong marker was passed. Poughkeepsie, N. Y., was right behind. Little Rock, Ark., nosed out Hagerstown, Md., in a hot duel at Latonia, with Flint, Mich., pulling up in third place. Birmingham, Ala., Indianapolis and Lancaster, Pa., were one-two-three at Hawthorne.

At Laurel, Hazleton, Pa., a slow starter, pushed into first place with Nashville, Tenn., taking second. Dayton hung on to third position throughout the furlong. Erie, Pa., Ft. Worth, Tex., and Bangor, Me., ran in that position at Bowie.

Welch, W. Va., jumped into the lead at Washington Park, with Charleston, W. Va., and Fernwood close behind. The first furlong at Fairmont found Davenport, Iowa, ahead, with Gulfport, Miss., second and Casper, Wyo., third.

H. G. Perkins, assistant to the president of Kelvinator Corp., will be sponsor for the third race on the card—the Perkins Stake Race. The start of this race will take place early Monday morning.

Winning Salesmen

Names of salesmen winning prizes in the Sayre Sweepstakes are as follows:

F. J. Ackerman, Buffalo; Dudley Baker, Los Angeles; J. H. Barlow, Charleston, W. Va.; W. E. Barrett, Gulfport, Miss.; Arthur Bell, St. Louis; Elmer Berger, New York City; C. Briggs, Peoria, Ill.; P. Brobstor, Clarksburg, W. Va.

H. L. Brown, Philadelphia; C. F. Buchman, New York City; C. G. Carlson, Flint, Mich.; Max Carson, Philadelphia; J. D. Cassidy, New York City; A. R. Clemons, Burlington, Iowa; M. L. Coleman, Memphis, Tenn.

H. Conrad, Allentown, Pa.; J. E. Corrigan, Albany, N. Y.; E. M. Crowe, Poughkeepsie, N. Y.; E. A. Dahl, Northern States, Minneapolis; L. F. Dahl, Denver; R. A. Day, Detroit; George Dent, Flint, Mich.

M. Diamond, St. Louis; J. L. Dilger, Newark; J. H. Donnelly, Denver; George Dulton, Baltimore; V. T. Earley, Akron, Ohio; H. Fautsch, Poughkeepsie, N. Y.; Alva Ford, Kelvinator-Ohio, Cleveland; Howard Gales, Los Angeles.

A. B. Garges, Washington, D. C.; B. Gatts, Flint, Mich.; J. B. Gessner, Huntington, W. Va.; A. G. Gliekhoff, Newark; Merle Gray, Syracuse, N. Y.; Wm. E. Hall, Clarksburg, W. Va.; P. Hampton, Omaha; W. R. Happer, Little Rock, Ark.

J. E. Heaps, Pittsburgh; J. B. Hewes, Lancaster, Pa.; A. Hilliar, Phoenix, Ariz.; A. Hoffman, Cincinnati; H. J. Hunt, Greenville, N. C.; W. L. Hunter, Birmingham, Ala.; R. P. Hussey, Hagerstown, Md.; E. J. Jones, Gastonia, N. C.

J. R. Jones, Welch; Joe Kenski, St. Louis; A. C. Kile, Scranton, Pa.; J. B. Kiser, Dayton; C. L. Kittle, Indianapolis; H. Kochel, Reading, Pa.; J. H. Lewis, Birmingham, Ala.; A. Luisi, New York City.

James Lyons, Syracuse, N. Y.; A. MacNichols, Wheeling, W. Va.; A. L. Mahon, Pittsburgh; J. B. Malone, Birmingham, Ala.; J. A. Martin, Buffalo; P. R. Martin, Denver; E. J. Mathews, Montgomery, Ala.

M. C. McNiel, Montgomery, Ala.; G. R. Miller, Greenville, N. C.; Gus Miller, Clarksburg, W. Va.; S. Moore, New York City; N. Moran, New York City; R. S. Morrison, Nashville, Tenn.; G. B. Morrow, Williamsport, Pa.; W. Moseley, Little Rock, Ark.

C. W. Murney, Los Angeles; H. M. Myers, Baltimore; S. Newell, Fernwood; Thomas O'Brien, St. Louis; Ted Pandis, Los Angeles; Kenneth Perkins, Syracuse, N. Y.; F. J. Poucher, Poughkeepsie, N Y.; Roger Putnam, St. Louis.

T. W. Rains, Nashville, Tenn.; Robinson Music Co., Wheeling, W. Va.; W. E. Rouch, Wiswell, Chicago; H. Sanderson, Little Rock, Ark.; A. Schmidt, Commonwealth; George Schofield, Dayton; C. Don Sheedy, Denver; Wm. Shore, Philadelphia.

N. Sidrow, Clarksburg, W. Va.; R. Singer, Clarksburg, W. Va.; F. L. Smith, Scranton, Pa.; F. M. Spark, Clarksburg, W. Va.; W. I. Taylor, West Kelvinator Co., Kansas City, Mo.; C. Teagardin, Columbus, Ohio; D. E. Thorpe, Baltimore; Frank P. Tighe, Boston.

W. L. Tobin, Springfield, Ill.; J. Roy Vandenberg, Denver; J. B. Walker, Casper, Wyo.; A. Warne, Hagerstown, Md.; Sam West, Denver; H. A. Westbrook, Alexandria.

Awards to the secretaries who are acting as racing stewards consist of fitted cases for feminine winners, and smoking sets for the men. The winners of the first series of steward prizes are as follows:

Miss C. F. Getty, Kelvinator Sales Corp., Pittsburgh; Miss L. Joyner, Carolina Kelvinator Co., Greenville, N. C.; Miss Ruby Van Meter, Pearson Piano Co., Indianapolis; Miss Ann Ehrman, Star Electric Co., Erie, Pa.; Miss Ellen Converse, Missouri Public Service Co., Warrensburg, Mo.; Miss Margaret Shopf, Landis Electric Co., Lancaster, Pa.

L. D. Zimmerman, Central Illinois Public Service Co., Springfield, Ill.; P. D. Sowell, 555, Inc., Little Rock, Ark.; A. H. Warne, Kelvinator Bohman, Inc., Hagerstown, Md.; W. W. Andresson, Mueller Lumber Co., Davenport, Iowa.

Commercial Contest

DETROIT—The third of a series of special campaigns in the Kelvinator "Commercial Leadership Program" opened Aug. 1 as the drive on the "hotel and institution" market got under way.

This campaign, like the meat market and liquid-cooling campaigns, was preceded by a nation-wide survey on the use of refrigeration in the institutional field, the results of which have been prepared in booklet form under the title, "Cutting Refrigeration Costs in Hotels and Institutions."

The booklet, which is filled with facts that deal with the prospect's problems and with costs relative to refrigeration, will be used as a sales closer. A book of commercial sales slants is also being prepared, giving suggestions on the best manner in which to present this sales closer to prospects.

A four-piece direct-mail campaign, written directly to the buyer in the institutional market, has been prepared. The final piece centers the prospect's attention upon the survey booklet.

No special prize awards for salesmen will be offered in this campaign, to avoid conflict with the Kelvinator Derby contest, in which all commercial salesmen are entered. The institutional campaign, according to the commercial specialists who have prepared it, is designed to provide "ammunition" for salesmen making a special effort to gain prizes offered in the Derby. One Derby ticket is issued for every $200 of commercial sales reported.

BARGER HEADS NEW G. E. MAJOR APPLIANCE GROUP

(Concluded from Page 1, Column 3)

tral station, salesmen's compensation, product, electric range, dealer, convention and distributors' dealer.

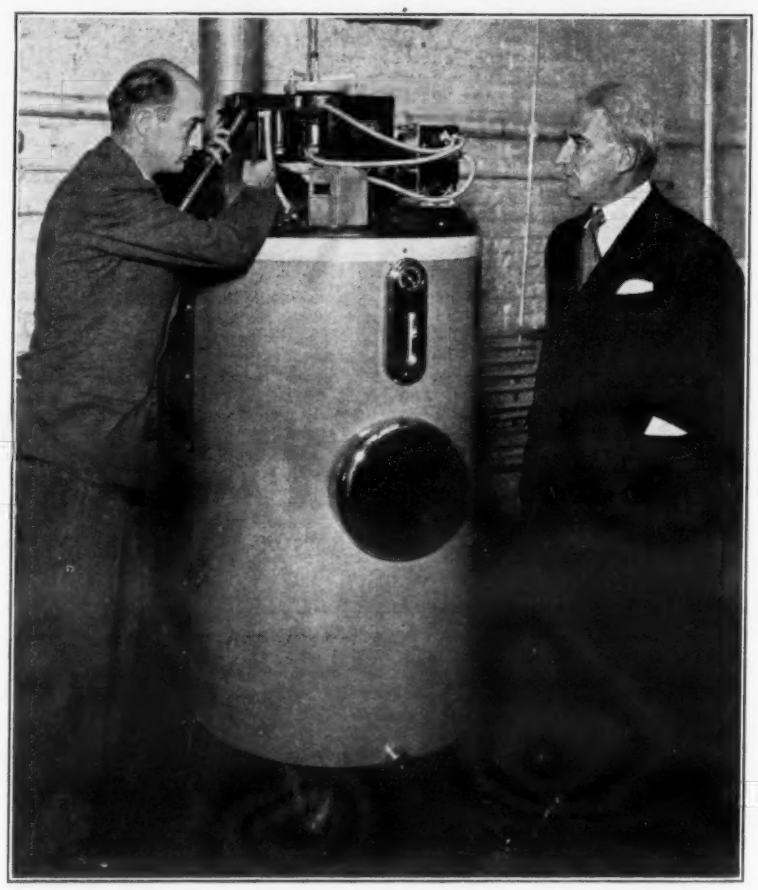
Mr. Barger's committee has been newly created, and will study the correlation of sales of major appliances and sales of refrigerators and ranges. Characterized as major appliances are: home laundry equipment, vacuum cleaners, sewing machines.

Other members of the committee are: John Busey, vice chairman; W. L. Thompson; C. L. McCrea, distributor in Washington, D. C.; E. Farmer; R. C. Cameron; S. C. Caswell, distributor in Michigan.

GIBSON MAKES 36% OF MAY EXPORTS TO HAWAII

GREENVILLE, Mich.—Thirty-six per cent of the total number of electric refrigerators of all American makes shipped from the United States to Hawaii during the month of May, 1932, were Gibson electric refrigerators, according to C. I. Horowitz, manager of the export department, Gibson Electric Refrigerator Corp.

General Electric Air Conditioner



Gerard Swope (right), president of General Electric Co., is shown the new oil burning furnace by E. D. Harrington, engineer of the new air conditioning department. Announcement of the unit was made last week.

N.E.L.A. ANNOUNCES SALES BY STATES FOR 6 MONTHS

(Concluded from Page 1, Column 2)

99.8 per cent of quota, Texas reached 98.6 per cent, New Jersey 98 per cent, and Utah, 96.2. Sales on the West Coast seemed to lag, with Washington reporting only 41 per cent of quota realization, and California only 40.8 per cent.

As usual, New York state reported the greatest number of unit sales—127,034—more than twice as many as the next rival, Pennsylvania, which reported 58,574. Illinois, with 48,498, was third.

	N.E.L.A. Quota First Six Months	Estimated Total Sales	% Quota Realization
New England			
Connecticut	10,638	13,203	124.2
Maine	4,741	3,612	76.3
Massachusetts	32,034	26,607	83.2
New Hampshire	3,285	2,034	61.9
Rhode Island	5,052	5,710	113.8
Vermont	1,979	1,519	76.8
Eastern			
Delaware	1,144	1,516	133.0
Maryland & D. C.	11,928	19,256	161.6
New Jersey	29,991	29,425	98.0
New York	96,976	127,034	131.3
Pennsylvania	55,228	58,574	106.2
East Central			
Kentucky	7,292	6,231	85.4
Ohio	40,397	29,459	73.1
West Virginia	4,776	6,607	138.6
Middle West			
Iowa	11,803	8,121	68.7
Kansas	9,068	6,374	70.3
Missouri	17,294	20,256	117.5
Nebraska	6,501	4,967	76.5
Pacific Coast			
Arizona	1,719	1,208	70.5
California	46,235	28,911	40.8
Nevada	464	654	141.0
North Western			
Idaho	1,517	1,216	80.3
Montana	2,059	1,436	69.7
Oregon	5,836	3,921	67.4
Utah	2,657	2,559	96.2
Washington	10,658	4,367	41.0
South Eastern			
Alabama	4,792	3,483	72.7
Florida	5,945	4,949	83.3
Georgia	5,043	5,032	99.8
North Carolina	6,025	4,700	78.0
South Carolina	3,115	2,329	74.8
Tennessee	6,207	5,449	87.8
Virginia	6,964	10,360	148.6
Great Lakes			
Illinois	48,564	48,498	99.8
Indiana	18,406	11,687	63.4
Michigan	29,352	20,072	68.2
Wisconsin	16,703	8,029	48.1
North Central			
Minnesota	12,444	11,573	93.0
North Dakota	1,581	1,140	72.1
South Dakota	2,088	1,009	47.8
Rocky Mountain			
Colorado	5,068	4,409	87.0
New Mexico	849	672	79.1
Wyoming	886	525	59.2
Southwestern			
Arkansas	2,942	2,304	78.0
Louisiana	4,843	3,557	73.8
Mississippi	2,656	1,410	53.2
Oklahoma	6,975	7,043	100.8
Texas	17,160	16,928	98.6
Totals	630,060	589,955	93.6

FOULDS NEW PATENT COUNSEL FOR DETROIT LUBRICATOR

DETROIT—Andrew K. Foulds of the New York offices of the American Radiator Co. has joined the Detroit Lubricator Co., local subsidiary of the American Radiator Co., as a resident patent counsel.

PEIRCE, MAJESTIC EXECUTIVE, TO BE MARRIED AUG. 10

CHICAGO—W. C. Peirce, Jr., assistant to the general manager of Grigsby-Grunow Co., will be married Aug. 10 to Miss Margaret Ann Phelps.

Miss Phelps is a sister of Charles M. Phelps, secretary of the Peirce-Phelps Co., Philadelphia, distributor of Majestic products. Mr. Peirce was with Peirce-Phelps before he joined the Grigsby-Grunow central office. The wedding will be held at St. Paul's Church, Chestnut Hill, Pa.

OAKLEY NAMED RECEIVER OF IDEAL LIQUID HEAT CORP.

ST. LOUIS—Ernest F. Oakley has been appointed by the Circuit Court of the City of St. Louis, division No. 3, as temporary receiver of the Ideal Liquid Heat Sales Corp.

Mr. Oakley has taken an inventory of the business and has submitted to creditors a statement that in his opinion the business can be successfully operated, there being sufficient assets on hand to enable him to carry on the business.

MADISON GARDENS TO HOLD SHOW SEPT. 16

NEW YORK CITY—Madison Square Garden will be the scene of a combined Radio, Refrigeration and Electrical Exposition Sept. 16 to 24 inclusive.

The exhibition will be to the public and the trade. Exhibitors will be furnished free tickets for all their dealers during trade hours, which will be from 11 a. m. to 1 p. m., except the first Friday and Sunday. Hours for the public only will be from 2 p. m. to 11 p. m.

Hours for Prospects

The special opening time for dealers and salesmen will enable them to bring their prospects early and have two hours in which to interview them before the crowd arrives, the Madison Square Garden Corp. believes.

Joseph Bernhart has been appointed by W. F. Carey, president of Madison Square Garden Corp., to manage the show.

Facilities for the exhibition include: water, gas and electrical connections available for any booth, to be installed at cost by the Madison Square Garden maintenance organization; storage facilities for any materials shipped in advance of the exposition; free removal from storage to the proper booth.

Uniform Decoration Scheme

The general decorative scheme of the entire exposition will be uniform, and the color schemes will be forwarded to exhibitors upon receipt of signed contract. Details of booth construction will accompany this information. Special signs will be made and installed by the Garden management, upon receipt of copy from the exhibitor.

A layout of the exhibit floor has been made, and reservations for booths may be sent to Joseph Bernhart, Madison Square Garden, New York City.

NEW McCORD EVAPORATOR GUIDE BOOK

SHOWS THE McCORD EVAPORATOR TO BE USED IN ANY TYPE OF BOX AND INSULATION, AND IN ANY GIVEN CLIMATE.

May We Send You A Copy?

McCORD RADIATOR & MFG. CO.

DETROIT, MICH.

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Seeger

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655-57 So. LaBrea Ave., LOS ANGELES, CAL.
666 North Wabash, CHICAGO, ILL.
644 Beacon Street, Kenmore Square, BOSTON, MASS.

AIR-CONDITIONING ISSUE

Merchandising Section

IN TWO PARTS PART ONE

ELECTRIC REFRIGERATION NEWS

Registered U. S. Patent Office

The business newspaper of the refrigeration industry

VOL. 6, NO. 49, SERIAL NO. 177
ISSUED EVERY WEEK

Copyright, 1932, by Business News Pub. Co.

DETROIT, MICHIGAN, AUGUST 10, 1932

Entered as second-class matter Aug. 1, 1927, at Detroit, Mich.

THREE DOLLARS PER YEAR
TEN CENTS PER COPY

FRIGIDAIRE MEN BEGIN HUNT FOR HIDDEN BUYERS

$10 Prizes To Salesmen Uncovering 'Planted' Prospects

DAYTON—A "Hidden Prospect Hunt," with a "planted" prospect in each neighborhood and a 10-dollar reward for the lucky canvasser who interviews her, is an idea being used by Frigidaire dealers in many districts during August.

Prior to a systematic canvass of each neighborhood, a prospect is determined in advance by the sales manager, and arrangements are made for her to be at home all day when the canvassers are operating in her vicinity. The salesman who is fortunate enough to call at her house, receives the reward, providing he is insistent enough to get through the door and present his sales demonstration.

The purpose of the plan, according to J. J. Nance, manager of the Frigidaire sales planning division, is to stimulate door-to-door canvassing by all salesmen, and to get sales literature into the hands of as many people as possible.

In order to qualify for the prize, the salesman must turn in a card showing that he has called upon the hidden prospect. She, in turn, is instructed to do or say nothing to indicate her identity. The name of the winner is announced at a sales meeting the following morning.

During August, Frigidaire salesmen will continue their commercial sales campaign, and will wind up the "2,250-000th Household Campaign," which is based upon that many calls by salesmen during July and August.

C.I.T. REPORTS PROFIT FOR FIRST 6 MONTHS

NEW YORK CITY—Net profits available for dividends of $2,947,280 are reported by the Commercial Investment Trust Corp., for the first six months of 1932. This sum compares with $3,863,814 for the first six months of 1931.

After dividends on the first preferred and serial preference stocks, the earnings were $2,085,801, equivalent to $1.03 a share on the average number of common shares outstanding in the hands of the public during the six months period, compared with $2,601,853, equivalent to $1,26 per share for the corresponding period of 1931. Dividend requirements on the common stock were $1 per share for the six months.

According to the report of Henry Ittleson, president, to the stockholders,

(Concluded on Page 19, Column 2)

TRITLE ELECTED OFFICER OF WESTINGHOUSE SUPPLY

EAST PITTSBURGH, Pa.—J. S. Tritle has been elected vice president in charge of operations of the Westinghouse Electric Supply Co., wholesale distributor of Westinghouse products. He will continue his duties as vice president and general manager of Westinghouse Electric & Mfg. Co.

FRED L. SHAW TO HANDLE AGENCY PUBLICITY

DETROIT—Fred L. Shaw has been appointed manager of the publicity department of Brooke, Smith & French, Inc., advertising firm, according to officials of the company.

Mr. Shaw is a former member of the publicity organizations of the Geyer Co., Dayton, Frigidaire Corp., and Trupar Mfg. Co.

LEONARD SALES MAINTAIN ADVANCE IN JUNE

DETROIT—Leonard electric refrigerator sales, which were greater during April and May of this year than for the entire year of 1931, maintained their climb during June, when shipments were five times those of the same month a year ago.

Selling Air Conditioning

Both Merchandising and Engineering Sections of this issue of Electric Refrigeration News are largely devoted to news and discussions of various phases of air conditioning.

Articles on the design, installation, performance, and application of various types of air-conditioning equipment will be found in the Engineering Section (see guide on page 1 of that section).

In the Merchandising Section you will find:

A directory of companies manufacturing air-conditioning equipment, classified according to the functions of the products they sell, on page 16.

How to sell air-conditioning equipment, as told by electric refrigeration outlets and factory sales managers, on pages 4, 10, 13, and 18.

Descriptions of equipment manufactured by various companies, on pages 4, 11, and 15. Full descriptions of air-conditioning installations in hotels, restaurants, railway cars, theaters, on pages 4, 6, 7, 14, 15, and 18.

Performance tests on page 18; articles telling the effects of air-conditioning indoor atmosphere on pages 11 and 15; descriptions of various exhibits of air-conditioning equipment on page 17.

KELVINATOR 'HORSES' START THIRD EVENT

DETROIT—So well-bunched as they pounded down the back stretch that spectators and bettors could barely tell who was ahead, horses in the second annual Kelvinator Derby last week hit up a fast pace to finish the second race on the Derby card, the Burritt Sweepstakes.

The names of the winners have not yet gone up, being based on returns postmarked not later than Saturday night, but the horses have already left the post for the third race on the program, the Perkins Stake Race.

H. G. Perkins, assistant to the president of Kelvinator Corp., is offering 100 sets, comprising a leather key holder and bill fold, to the salesmen earning the most tickets during this two-week "race."

As the Burritt event reached the "half," only three out of 10 of the "favorites" of the week before were still leading.

At Pimlico, Philadelphia had overtaken Pittsburgh and had drawn into first place, pushing Pittsburgh down to a tie with Newark for second. Baltimore came up to third.

Out at Churchill Downs, Los Angeles, running second, took a sprint through the pack to overtake St. Louis and Syracuse, N. Y., the pace-setters. Milwaukee, running a pretty race, came up to run stride for stride with St. Louis in

(Concluded on page 19, Column 1)

2,250,000TH FRIGIDAIRE STARTS ON OCEAN CRUISE

SAN FRANCISCO—Laden with the choicest of California fruits, the 2,250,-000th Frigidaire sailed recently on the *President Pierce*, Dollar Line steamship, on the start of its round-the-world cruise.

Besides representatives of the steamship company, others in attendance at the sailing ceremonies were: Malcolm A. Fraser, secretary to the mayor of San Francisco; H. M. Crawford, general sales manager, Pacific Gas & Electric Co.; H. N. Carroll, sales manager, Pacific Gas & Electric Co.; R. G. Hutchison, regional manager, and C. C. Lee, manager of the Oakland district, Frigidaire Corp.

First stop will be Honolulu, where Von-Hamm-Young, Frigidaire dealer, will entertain at luncheon aboard the liner.

The refrigerator will arrive in New York on Oct. 11.

GEORGE DWELLEY APPOINTED JEWETT SALES MANAGER

BUFFALO—George M. Dwelley, at one time sales manager of Kelvinator Corp., has been appointed sales manager of the Jewett Refrigerator Co.

Aggressive sales promotion of the Jewett line of electric refrigerators, and development of the distributor and dealer organizations, will be carried out by the new sales manager.

Dwelley comes to Jewett direct from the Copeman Process Co. of Detroit.

Kelvinator Names 4 Oil Burner Managers

DETROIT—Four divisional sales managers to handle the sales of the Rightway oil burner for Kelvinator Corp., have been named by H. W. Burritt, vice president in charge of sales.

Alfred A. Lee will handle the Ohio, Michigan, Indiana, Kentucky and West Virginia territory; William H. Lyon was appointed division manager for New England; V. C. Page will take charge of the territory in eastern Pennsylvania, southern New Jersey, Delaware, Maryland, District of Columbia and Virginia; J. M. Knox will handle Illinois, Wisconsin, Iowa, Nebraska and Minnesota.

Active development of sales will be limited to six major divisions, Burritt states. In each case the men appointed and to be appointed have been identified with Rightway oil burner sales since it was first put on the market.

7-MONTH NORGE SHIPMENTS PASS TOTAL FOR ALL 1931

DETROIT—Sales of Norge refrigerators for the first seven months of 1932 almost equalled the total volume for the year 1931, according to Howard E. Blood, president of Norge Corp.

Mohawk Sales Exceed Total for 1931

NORTH TONAWANDA, N. Y.—Sales of Mohawk electric refrigerators for the first six months of 1932 exceeded those for the entire year of 1931 by 125 per cent. The All-American Mohawk Corp. reports that the greatest demand has been for larger capacity models.

Sales Manager

GEORGE M. DWELLEY
Newly appointed sales manager of Jewett Refrigerator Co.

G. E. Distributors Plan Intensive Fall Campaign

Conventional Unit Announced; Distribution of Other Appliances Suggested

By George F. Taubeneck

CLEVELAND—General Electric refrigerator distributors are going to work in earnest this fall. The first thing they did upon arriving here Tuesday morning, Aug. 2, for Camp Refrigeration VI, was put on overalls and black, long-billed caps. From that moment on through three days of discussions at Nela Park they sessioned and "thrashed things out" in the same intensive manner with which they used to play at such gatherings. The usual frills, furbelows, dramatic presentations, lavish entertainments, and furious recreation were missing. Instead almost every waking moment was spent considering ways and means of getting more business next fall.

Chief among the important decisions and agreements arrived at during the course of this highly serious congress of distributors and General Electric officials was the announcement that in addition to General Electric refrigerators and General Electric Hotpoint ranges, most of these distributors will handle other G. E. household appliances, including the dishwasher and home laundry equipment (washing machine and ironer), as well as a new refrigerator.

The new refrigerator, sponsored by the Edison General Electric Appliance Co., Inc., has a conventional type refrigerating machine in a 5-cu. ft. box, and will be marketed at $147 plus delivery and installation charges.

This "package type" unit, which is in the top of the box, has a reciprocating compressor with three moving parts, forced feed lubrication, an overload trip relay with visual indicator, a stainless steel chilling unit, and carries a standard one-year guarantee.

Another Monitor Top Election Campaign, similar in detail to the sales contest of that name conducted by the G. E. refrigeration department last year, will be run again this fall.

Every member of the distributing organization, including distributors themselves, their junior executives, dealers, and salesmen, will be running for office in the state of Refrigerania in this campaign. Inasmuch as it will coincide exactly with the national political campaign for the presidency of the United States, G. E. officials think it is particularly well timed.

Opening the camp Tuesday morning was a "parade of workers," in which the 200 distributors and their lieutenants, and G. E. headquarters men, donned overalls and black workmen's caps, shouldered shovels, and took on the aspect of laborers.

Still garbed as "the man with the hoe," the distributors rallied 'round the

(Concluded on Page 2, Column 1)

Pushes Coolers

J. C. CHAMBERS
Manager of Frigidaire's active air-conditioning division.

G. E. TO HOLD SECOND POLITICAL CAMPAIGN

CLEVELAND — The 1932 General Electric "presidential" campaign, will be in the form of a series of races on on the new "G. E. Circle track, world's largest, finest, and best-equipped home of the Sport of Kings."

Fifty-four spirited horses (distributors) will face the barrier at each of these races, each of which will take one week. Winners of the races will be decided upon by the number of votes polled by each candidate for each week of the Monitor Top Electric Campaign. Prizes will consist of cash bonuses.

Rules and regulations covering the election campaign itself have been simplified.

Boundaries and political structure of "Refrigerania" correspond with the sales structure of the General Electric refrigeration organization. As there are seven general sales territories, there are seven political districts in Refrigerania. As there are 54 distributors in the sales structure, there are 54 states in Refrigerania.

The officers to be elected are: President, the leading distributor in the nation; vice president, leading distributor

(Concluded on Page 19, Column 4)

BRITISH CONFERENCE MAY OPPOSE U. S. BRANCHES

OTTAWA, Can.—American branch plants in British countries would become almost entirely alienated from their parent countries in the United States under a scheme of empire content which has been said unofficially to be under consideration by the imperial economic conference.

If adopted, such a plan would mean that a subsidiary or branch plant of an American manufacturing firm, whether in Canada or any other nation of the British commonwealth, would have to guarantee that 60 per cent of the total value of its product represented British labor and materials. Otherwise that plant would not enjoy any intra-empire tariff preference.

The benefit to Canadian industry would be derived from less competition by American branch plants.

DALTON NAMED GENERAL REFRIGERATION MANAGER

BELOIT, Wis.—E. J. Dalton, president of the Yates-American Machine Co., has been appointed general manager of the General Refrigeration Co., succeeding the late James R. Morash.

For the present, Mr. Dalton will devote all of his time to his new duties, but he will continue as president of the Yates-American company.

GRAYBAR WILL OPERATE KELVINATOR BRANCH

CLEVELAND—Kelvinator factory branch, at 4400 Euclid Ave. here, has been taken over by the Graybar Electric Co.

Manager of the new distributing organization is G. N. Seiss; D. M. Julian is assistant manager, and G. F. Bertke is manager of the Kelvinator department.

ROOM COOLER SALES FOR 6 MONTHS SET RECORD

NEW YORK CITY—Sales of room coolers by members of the Refrigeration Division of the National Electrical Manufacturers Association for the first six months of this year were 222 per cent of sales for all last year, and were 382 per cent of sales during the entire year of 1930, according to Nema statistics.

DISTRIBUTORS TALK WORK AT G. E. CAMP

(Continued from Page 1, Column 5)

Nela Park camp flagpole while Congressman C. A. "Doc" Eaton of New York, who generally shoots the first Camp Refrigeration oratorical gun, delved into his arsenal of inspirational ammunition for a few anecdotes of genuine "hard times" and hard work.

A skit, "Abou Ben Adhem's Advice," produced by the merchandising division of the electric refrigeration department, tore the wrapper off the morning program.

Red-headed Art Scaife presented the latest, approved, double-extra, five-star-final edition of the G. E. sales demonstration during the progress of the skit.

Junius R. Tribe, dapper salesman for the Utah Power & Light Co., Ogden, Utah, demonstrated how he won the national visualizer contest by making the "visualizer presentation" (prepared sales talk embellished by the use of a board hung with various gadgets and materials which are designed to help the prospect envisualize the service offered by a G. E. refrigerator) before the assemblage.

Use the User

M. F. Mahony, manager of the merchandising division, A. A. Uhalt, manager of the dealer division, and H. H. Bosworth, manager of the central station division, concluded the day's session.

Special emphasis was laid by Mr. Mahony on the idea of using the user.

Mr. Mahony also announced that special schools for sales managers will be conducted in Cleveland during November and December, and that the Toppers Club (some 400 retail salesmen who will each sell at least $25,000 worth of G. E. refrigeration equipment during 1932) will be entertained by the G. E electric refrigeration department during January.

The Aerocar, an automobile trailer in which G. E. refrigerators and other appliances may be taken directly to the prospect, was discussed by Mr. Uhalt.

A rousing torchlight parade and political rally Tuesday night heralded the second Monitor Top Election Campaign. Orators included Mr. Mahony, Paul B. Zimmerman, chief justice of Refrigerania and manager of the electric refrigeration department, and Jean De Jen, election campaign manager. (Rules and regulations of this contest are given at the end of this story).

Advertising Program

Walter Daily, advertising and sales promotion manager, came to bat first in the Wednesday sessions.

His summary of G. E. advertising, thinking and planning during the year was sugar-coated by the scheme of breaking down his speech into parts spoken by members of his department—just as if the department were "in conference," and each little speech were a spontaneous expression of the speaker's idea, with Walter invariably approving.

Members of the advertising and sales promotion department who took part in the skit included W. C. Jones, O. C. Hamilton, R. C. Shaw, E. H. Norling, K. R. Davis, J. T. Dickson, and Sylvester Nock (office boy).

Reduced to text, Mr. Daily's semi-dramatic form of exposition would read something like this:

"These are unusual days, and the expenditure of considerable sums of money must be carefully thought out and justified. It is well to keep in mind that 'dimes are dollars.'

"There is no black magic connected with these two forces of advertising and sales promotion; they are simply two of the five major costs of distribution. The other costs are personal selling, warehousing and transportation. The three just mentioned are subject to economy, generally speaking, but, nevertheless, an actual expenditure of money usually cannot be avoided.

Penalty for Discontinuance

"Advertising and sales promotion, however, may be eliminated; and if they *are* eliminated, business will be done for a certain period of time.

"There are many cases on record of companies which have discontinued their advertising and sales promotion, but there are *no* cases wherein a penalty has not been paid for such action.

"Advertising men, who have been at it many years, are firm in the conviction that there is no stronger force than magazine advertising for the promotion of a specialty product. It builds confidence in a product, and an acceptance of it which cannot be obtained in any other way.

"There are some who believe that magazine advertising should be cut down, and the consequent saving passed along to distributors, dealers and salesmen—or perhaps used for other forms of advertising. That this is an incorrect premise may easily be proved by an examination of the reasons *behind* the success of leading products.

"More and more, national advertisers are beginning to believe that some of the national magazine advertising expense should be borne by distributors and dealers.

"Perhaps the nearest approach to national magazine advertising is the radio. It is a rather difficult medium to handle, and yet the results are well worthwhile and more than justify the work expended.

"It is quite true that our daytime program appeals to *women* and for that reason perhaps the interest of our distributors, dealers and salesmen has not been as great as it would be were we conducting an evening program.

"I should like to urge once more utilization of this program by our distributors and dealers while it is on the air. Urge prospects to listen to Madame Sylvia, as some of our distributors are doing regularly, for unless we receive dollar value from it we, naturally, cannot afford to continue.

Newspaper Advertising

"We are constantly working on our newspaper advertising, for newspaper advertising still seems to be the best form of *local* advertising, and still is the greatest single expenditure on the General Electric refrigerator.

"We have no illusions in regard to our newspaper ads. We do not yet believe that they are the best that can be produced—yet this opinion might be true of any form of advertising, or, in fact, of any form of selling.

"If it were possible to attain perfection, we would soon lose interest in life. Perhaps, this explains why the '100' golfer gets more pleasure out of the game than the one who plays in the low 80's. The former hacks, and digs, and plows his way around the course hole-after-hole, and then makes a shot which even a professional could not equal.

"Good newspaper advertising is the result of 70 per cent sweat and 30 per cent inspiration.

"Outdoor advertising is the great co-operator with newspaper advertising. When both are used, the acceptance of General Electric refrigerators seems to be greater than in the city where only one of these media is used.

"Direct mail is a subject on which we all like to think ourselves experts, and yet it is well to bear in mind that it is one of the most difficult forms of advertising with a product such as ours.

"One weakness, which we should correct at once, is the lack of notification to the salesman of the time and type of mailing piece which is sent to his prospects. In many cases, direct mail is being sent out without the knowledge of the salesman, although it is obvious that the greatest efficiency cannot thus be effected.

Sales Education Necessary

"Sales education today is more necessary than ever before, for selling requires more subtlety and finesse than ever was possessed by the high pressure, go-getter type of a year or so ago.

"The salesman must know his product, but, more important than that, he must know why this product should appeal to the particular prospect to whom he is telling his story.

"In my opinion, the *idea* of electric refrigeration has assumed a new importance, owing to present economic conditions. This is the main reason why economy, particularly, is a major selling point today.

"So important is this new viewpoint that the green salesman is often the best. He does not reach conclusion on prospects as quickly as the older man, and very often his slant on electric refrigeration, as applied to 1932, is in keeping with the times.

Ideas, Values Succeed

"The salesman who swept the buyer from his feet with a barrage of verbs and adjectives, seems to be lost in the shuffle. Ideas and values succeed today, where a mere recital of the selling points often fails. We must know what the 1932 buyer wants, and for what he is willing to pay.

"We all know that considerably more selling would have been done during the last two years had salesmen, generally, learned something about the prospect and what he wanted before they tried to sell him what they though he should have.

"Too, we are all familiar wih the circumstances wherein four or five salesmen of leading makes of electric refrigeration have been calling on the same prospect for months, yet none of them could arouse his interest or say very much to him which would make him feel that one man's story was very much different from the other. And yet, along came a green salesman, with a fresh viewpoint, and out of a clear sky he obtains the order.

"In my opinion, it is impossible to over-estimate the value of the Sales Correspondence Course. It is more applicable to today's selling than to yesterday's, for common sense and straight-forward selling are its fundamentals.

"We believe that the enrollment charge of $1.00 has been helpful, for it has placed a monetary value on the course. The sales of today are going to the *student* type of salesman, and for this man we offer what we believe is a thorough grounding in the fundamentals of electric refrigeration.

"There are now 32 home service directors operating actively in our distributorships. These women have been vastly under-rated, and the fine work which they have done in the cultivation of prospects—in fact, the turning of these prospects into actual sales—has been minimized.

"For instance, a gathering together of 10,600 women in five months in the Cleveland distributor's showroom, alone, is a worthwhile accomplishment, for these 10,600 women were all told the story of the General Electric refrigerator.

Reminder Items

"For gatherings of this kind we have reminder items such as:

(a) *Card table cover*—This fabricated cover, costing 35 cents, can be used again and again. In the Cleveland distributorship, they have been used for more than six months, and they still look like new. They are lent often to large bridge parties and to similar gatherings.

(b) *Playing cards.*
(c) *Bridge score pads.*
(d) *Salt and pepper shakers.*
(e) *Sugar bowl.*
(f) *Water bottle.*
(g) *Rolling pin.*

"We should not delude ourselves with the belief that salesmen on commission cost nothing; that truckage to and from a warehouse is not a genuine expense item; or that long distance telephone calls, telegrams, etc., are not just as much subject to curtailment.

"In other words, the intangible expenses should be examined with the tangible, and hence the program considered as a whole.

"Advertising and sales promotion are needed more today than ever before. We should remember:

"That—We do not know just *who* our prospects are, or just *where* to find them.

"That—Personal selling, with all its indispensable *persuasive force,* has its limitations.

"That—Business today involves *more than selling*—it involves *buying.*

"That—You can buy a market much cheaper today when fewer manufacturers are making a serious bid for it, than when everyone else is spending as much as we are. We are getting more for our advertising dollar today than ever before.

"That—If we do *not* desire to leave the name and reputation, which we have established over the years, to new arrivals who have more *courage* than we have, then it is *not* all right to discontinue our advertising.

"That—We do not want to cast aside this *insurance policy,* which is sure to pay dividends. 'Do not,' as William Wrigley stated a few years ago in discussing advertising, 'remove the coal or the electricity from the locomotive, for it will not keep going without motivation.'"

Commercial Field

Pointing out that the commercial refrigeration field is one which is being generally overlooked by most distributors just now, Walter Landmesser, commercial division manager, listed the applications to which, and the equipment with which, General Electric commercial refrigeration units may be hooked, as follows:

Display cases (General Electric standard); display cases (every type manufactured by makers other than G. E.); walk-in coolers; multiple hook-ups of commercial refrigeration equipment; finned coils—every type; bulk ice makers; large ice-cube makers; ice-making evaporators (remote); large capacity tank water coolers; ice cream cabinets (remote installation); special equipment (remote installation of machines up to ½-hp. capacity); small circulating water systems; dry storage milk coolers; a complete line of milk coolers; low-temperature refrigeration storage cases; beverage coolers; X-ray and photographic cooling equipment; soda fountainettes.

"We will install G. E. conditioned air commercial refrigeration equipment in any good manufacturers' display case," stated Mr. Landmesser.

Mr. Landmesser called particular attention to the commercial refrigeration selling job done by Gentsch & Thompson, Boston G. E. distributors; and declared that similar concentration on commercial business would yield equally profitable returns to other distributors who would emulate their example.

Malcolm Bard followed Mr. Landmesser to present the results of a survey he and some helpers had recently conducted in an Ohio territory—a test-hole dug to prove that commercial business is ready and waiting for those who will investigate their own markets. The survey included these figures:

Number of towns contacted	7
Number of outlets on survey forms	752
Those using ice	314
Those without refrigeration	22
Those using electric refrigeration:	
Less than four years	338
Longer than four years	46
Those needing additional equipment	32
Number selected for direct mail	332
Number of above covered by contacts	243
Class A prospects	27
Class B prospects	59
Class C prospects	137

27 Class A Prospects

Actual requirements—$35,000

19 display cases
7 storage cabinets
2 walk-in coolers
1 8-hole ice cream cabinet
2 water coolers

59 Class B Prospects

Actual requirements—$85,000

36 display cases
27 storage cabinets
5 walk-in coolers
8 ice cream cabinets and water coolers

Apartment Replacements

George Kobick, manager of the apartment house division, told distributors that apartment house refrigerator sales comprised a plus business. Employing facilities which must be maintained anyway, increasing the overhead scarcely any, all the distributor need do is add salesmen to get his share of this profitable business, he declared.

Saturation in the apartment house field is now around 73 per cent, Mr. Kobick estimated. In 1931 it was about 67 per cent, and in 1930 about 50 per cent, according to his figures.

During the first half of 1932, 19.4 per cent of the G. E. apartment house sales had been replacements, he stated. R. Cooper, Jr., in Chicago, is having an especially good replacement business, observed Mr. Kobick.

Ralph Cameron, manager of the department store division, maintained that the department stores will get a larger percentage of electric refrigerator retail sales during the next year, and urged distributors to consider these outlets more seriously as possible movers of G. E. refrigerators.

Zimmerman Examines Position

P. B. Zimmerman closed the day's sessions with a review of the G. E. accomplishments during the last five years, and with an examination of the position of the company today.

He concluded in time for some of the distributors to get in a round of golf before dark.

Wednesday night the entire group met at an outdoor shore dinner at Nela Park. Tables were heaped high with clams, lobster, chicken, roasting ears, and watermelon.

After an amazing portion of the amazing quantities of food at this amazing feast had been stowed away, the distributors and headquarters men puffed away at cigars while tap dancers and boxers entertained them for a short time.

The final day of the convention was devoted to discussions of sales and promotional activities on the G. E. Hotpoint range, the G. E. all-electric kitchen, other home appliances, including the washing machine and ironer.

Hotpoint Range Sales

Officials of the Edison General Electric Appliance Co., Inc., makers of the Hotpoint range, pointed out that the Christmas season always offers a good sales opportunity for ranges; that the electric range industry would launch an institutional campaign to the trade in September this year.

Furthermore, no new models will be brought out for Christmas selling activity, and therefore distributors may feature any ranges they have in stock.

George A. Hughes, president of the Edison General Electric Appliance Co., Inc., explained that many utilities have given definite signs that they will spend a great part of their future advertising appropriations on electric ranges, and that this year range advertising done by many of them will be greater than ever before. He said that many utilities would make the electric range their major sales effort.

Pierre L. Miles, range sales manager, also emphasized the Christmas range campaign. He pointed out that his company had made available a number of sales helps to range sales outlets, including a sales correspondence course.

W. A. Grove, manager of advertising and sales promotion, told distributors that the biggest part of the advertising budget would be set aside for newspapers and direct mail on the fall and Christmas activity.

Mr. Grove also said that, in the first six months of this year, five times as much money had been spent in national advertising of the G. E. Hotpoint range as was expended during all of last year. During the rest of this year, he declared, a drive would be made for immediate sales, local advertising being emphasized.

J. R. Poteat, manager of distributor operations for the company, outlined the work of his division. M. H. Beekman presented various sales helps which the merchandising division, of which he is manager, has made available to the distributors, retailers and salesmen.

The assembled distributors cheered the description by Judson C. Burns, Philadelphia distributor, of a new range sales campaign to be launched by the Philadelphia Electric Co. soon. This utility has appropriated approximately $35,000 for newspaper and outdoor advertising, and for sales prizes.

Moreover, it has arranged for low down payment on the part of the purchaser, and liberal terms; and has also arranged to finance dealer paper, and to help eliminate the problem of installation cost.

The distributors voted to send the following telegram, composed by Mr. Hughes, to Horace Liversidge of the Philadelphia Electric Co.:

"In national convention assembled at Nela Park Cleveland the GE Hotpoint range distributors express their individual and collective appreciation for your most constructive and farseeing program for dealer cooperative range selling as outlined by Mr. Judson C. Burns here today stop we believe this progressive move will be farreaching in its effect and it should arrest the serious attention of all utilities nationwide we also feel you have made a real contribution to the industry and to the restoration of economic confidence."

All-Electric Kitchen

Lorin Smith, director of the General Electric Kitchen Institute, predicted that the time is not far distant when the kitchen which is not completely electrified will be out-moded.

Smith, whose headquarters are in Chicago, explained that the G. E. Kitchen Institute is equipped to provide builders and others with suggested kitchen plans, although the institute does not take the place of architects. It merely suggests and recommends the best way to make use of all kitchen appliances. Its services are available to architects and individuals without cost.

A new G. E. kitchen auto truck, completely equipped with G. E. refrigerator, Hotpoint range, dishwasher, electric clock, toaster, ventilating fan, radio, work desk, sinks and breakfast nook, was displayed at the convention for the first time.

Apartment House Market

The apartment house field, which provided the initial impetus for the sale of electric refrigerators, will be the "first big market" for electric ranges and all-electric kitchens, G. E. executives pointed out.

"In times of adversity, we must have diversity," declared Charles Wilson, vice president of the General Electric Co., with headquarters at Bridgeport, Conn.

"We of the G. E. merchandise department have looked longingly at you refrigerator distributors in days past," he said. "And now we feel that the time is ripe for you to push laundry equipment and other items—which can be done without increasing your overhead or adding to your fixed charges."

Other speakers at this afternoon session included J. L. Busey, W. D. Yates, J. M. Wicht, and D. C. Spooner, all of the G. E. merchandise department at Bridgeport, Conn.

C. G. Smith, discussing financial operations, advised the distributors to watch their overhead, and cut operating costs wherever possible. He concluded by reading that oft-quoted verse of Longfellow's beginning:

"Let us then be up and doing
With a heart for any fate," etc.

T. K. Quinn, vice president of the General Electric Co., rang the curtain down on this camp (see "The Expansion Valve" on page 12 of this issue for further details on this speech).

Attendants at Camp

Among those from the field who attended Camp Refrigeration VI were:

Clark Adams, Atlantic City, N. J.; Albert Ahrens, Oklahoma City; T. B. Allen, Philadelphia; W. D. Alexander, Atlanta; R. W. Ayers, Schenectady, N. Y.; R. T. Bard, Columbus, Ohio; Turner Barger, Columbus, Ohio; C. C. Barnes, Bridgeport, Conn.; H. F. Barnes, Cleveland.

C. J. Bassler, Chicago; George Bauder, San Diego, Calif.; M. H. Beekman, Chicago; George Belsey, Los Angeles; L. H. Bennett, San Francisco; H. G. Bogart, Jr., Toledo; J. H. Bradley, St. Petersburg, Fla.; D. E. Breckenridge, Springfield, Mass.; M. S. Brenon, Detroit.

C. O. Brown, Nashville, Tenn.; H. S. Brown, Toronto, Ont.; M. E. Brown, Louisville, Ky.; R. E. Browne, Columbia, S. C.; J. L. Buchanan, Bridgeport, Conn.; R. P. Burns, Philadelphia; J. C. Burns, Philadelphia; J. L. Busey, Bridgeport, Conn.

E. H. Campbell, New York City; S. C. Caswell, Detroit; Rex Cole, New York City; F. B. Connelly, Butte, Mont.; Kenneth Connelly, Butte, Mont.; F. D. W. Clark, Philadelphia; John Convery, Philadelphia; R. Cooper, Jr., Chicago; H. H. Courtright, Fresno, Calif.; F. H. Cushman, Cleveland.

D. P. Dinwoodie, Detroit; J. J. Donovan, New York City; L. W. Driscoll, Charlotte, N. C.; A. S. Dunning, Duluth, Minn.; Dr. C. A. Eaton, Washington, D. C.; E. B. Edmundson, Houston, Tex.; Frank Edwards, Salt Lake City; Henry Ervin, New York City; E. M. Farmer, Portland, Me.; A. E. Faure, Bridgeport, Conn.

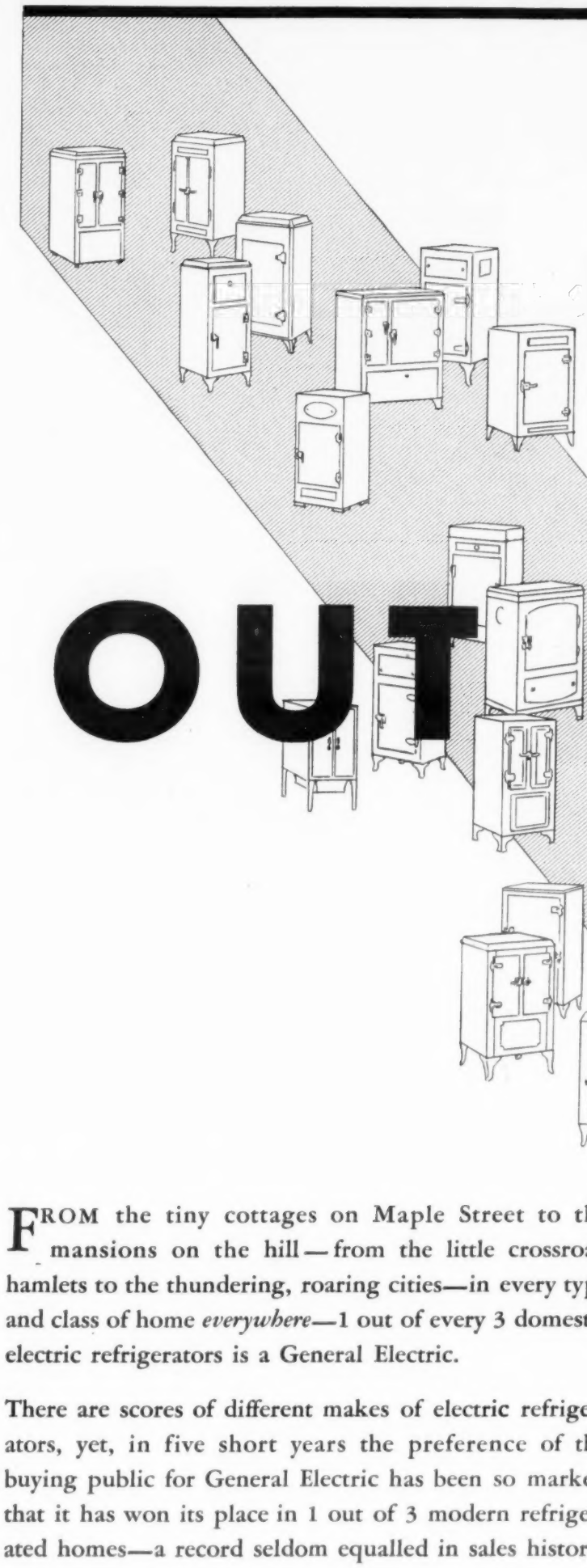
R. H. Ferguson, Chicago; A. J. Finck, Omaha; A. E. Freshman, Memphis, Tenn.; C. D. Gentsch, Boston; H. J. Gerlach, Erie, Pa.; H. W. Gifford, Chicago; E. C. Givens, Buenos Aires, S. A.; M. A. Glueck, Kansas City, Mo.; Chas. Gould, Portland, Me.

S. C. Griswold, Dallas, Tex.; W. A. Grove, Chicago; P. H. Harrison, Newark; F. T. Harvey, New York City; L. A. Hawkins, Schenectady, N. Y.; A. F. Head, Indianapolis; Paul Hichborn, New York City; W. B. Hill, Schenectady, N. Y.; D. F. Hines, Baltimore; W. N. Hogan, Wheeling, W. Va.; Max Holz, Fort Wayne, Ind.; Geo. A. Hughes, Chicago.

R. L. Hughes, St. Louis; K. H. Huyette, Fort Wayne, Ind.; L. D. James, St. Louis; A. H. Johnson, Baltimore; W. H. Kaiser, Boston; J. L. Knight, Erie, Pa.; L. C. Kohlman, Chicago; H. D. Laidley, Portland, Ore.; Chester Lichtenberg, Ft. Wayne, Ind.

C. L. McCrea, Washington, D. C.; L. R. Maxon, Detroit; A. W. Merriam, Albany, N. Y.; W. L. Merrill, Schenectady,

(Concluded on Page 19, Column 3)



ONE OUT OF THREE

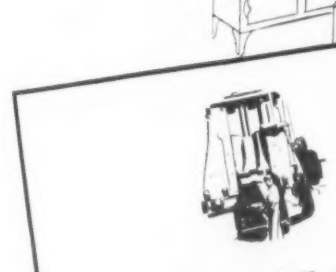
FROM the tiny cottages on Maple Street to the mansions on the hill—from the little crossroad hamlets to the thundering, roaring cities—in every type and class of home *everywhere*—1 out of every 3 domestic electric refrigerators is a General Electric.

There are scores of different makes of electric refrigerators, yet, in five short years the preference of the buying public for General Electric has been so marked that it has won its place in 1 out of 3 modern refrigerated homes—a record seldom equalled in sales history.

This amazing endorsement is splendid tribute to the name General Electric—splendid reward for the fifteen years of tests and research that made this outstanding refrigerator possible.

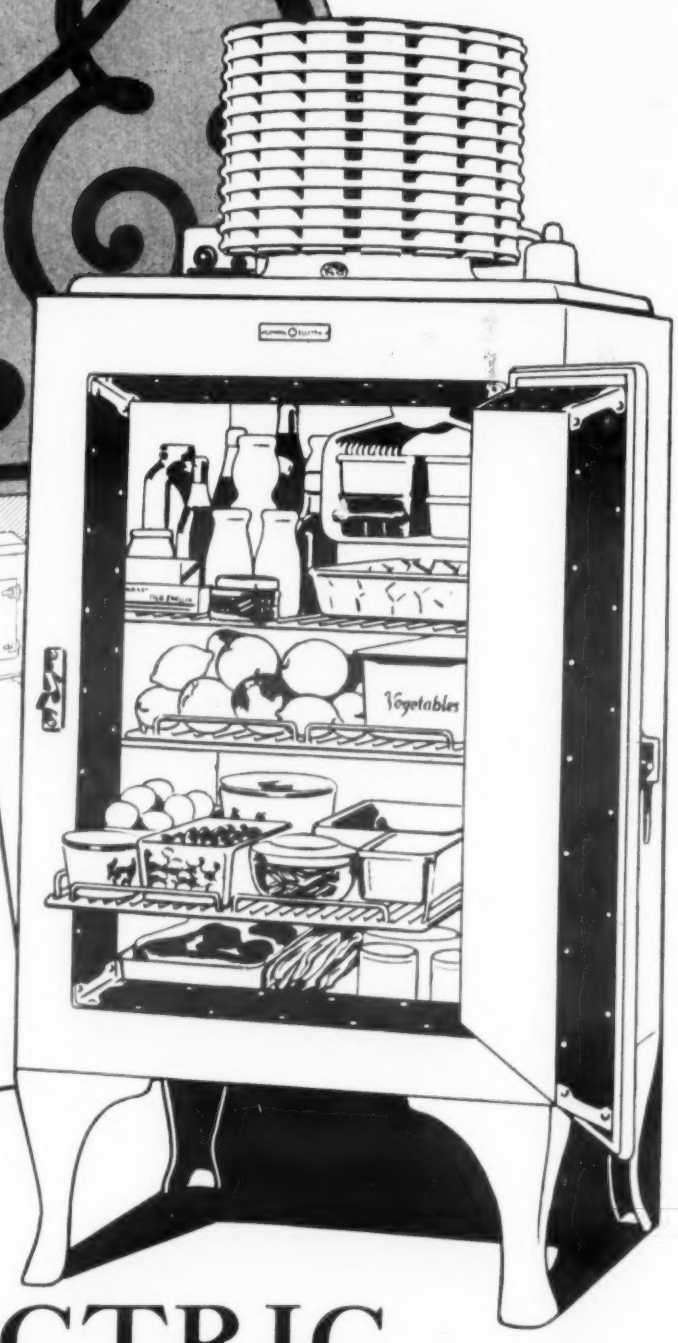
The uninterrupted, attention-free service of the famous Monitor Top mechanism has won the enthusiastic praise of every G-E owner. They tell their friends—and these recommendations are making new prospects for G-E retailers every day.

General Electric Company, Electric Refrigeration Department, Section DF 81, Hanna Bldg., Cleveland, Ohio.



THE STORY OF QUALITY NO. 2

Every refrigerating unit has parts which must withstand pressure. Such parts in the General Electric refrigerator are made of steel drop forgings and steel punchings. G-E forging operations use hammers up to 8,000 pounds capacity. On the unit base alone there are four separate breakdown, shaping and forging operations to insure rugged durability.



GENERAL ELECTRIC

ALL-STEEL REFRIGERATOR

DOMESTIC, APARTMENT HOUSE AND COMMERCIAL REFRIGERATORS—ELECTRIC WATER COOLERS

GOWN SHOP INSTALLS 2 AIR CONDITIONERS

BOSTON—Air-conditioning equipment has been installed in the gown shop of Lamson & Hubbard, Inc., 304 Boylston St., to cope with the excessive heat caused by bulbs in the indirect lighting system of the shop.

Discomfort of clerks, irritability on the part of customers, the soiling of many gowns by perspiration during the fitting process, were reasons given for the purchase of the air-conditioning equipment. The shop was so designed that its natural ventilation was inadequate to care for the heat generated by the bulbs.

The air-conditioning equipment installed consists of two Frigidaire S-3 cube units mounted on top of wardrobe display cases and a Frigidaire V-3 floor unit located at an elevator enrtance. This equipment is on the second floor with compressors in the basement.

This installation is manually operated from control switches on the V-3 model. Clerks can start and stop either the fans or the cooling unit whenever conditions require.

CLIMATOR II CLEANSES, HEATS AND HUMIDIFIES AIR

MILWAUKEE—The L. J. Mueller Co. here is manufacturing the Climator II, an air-conditioning system which heats, cleanses, circulates, and humidifies the air. Although no refrigeration is employed, the equipment effects reduction of temperature, where humidity is low, by washing the air.

Climator III, a unit designed for use with Mueller and other makes of heating equipment, circulates, washes, filters, and humidifies the air. Its washer may be used for cooling the air in the summer.

How To Sell Air Conditioners

As Told By W. D. Jordan, President, Air Control Systems, Inc.

CHICAGO—Because the Zephyr air conditioner is not sold as a package product, W. D. Jordan, president of Air Control Systems, Inc., has developed a sales system requiring that all distributors of the equipment act also as retailers, and making it necessary that all distributors, dealers, and salesmen have a complete engineering knowledge of the system.

Installation of a Zephyr unit requires that not only must the condensing unit be installed, but heating, water, and waste connections must be made wherever the equipment is placed.

Thus the services of plumbers, steam fitters, and electricians are needed to effect an installation.

Significance to System

This fact has a twofold significance relative to the organization's sales system:

(1) The salesman must be prepared first to "sell" his system to his prospect, then figure the type of equipment needed, its cost, location, and effect, and finally direct workmen in installing it.

(2) By virtue of the fact that each Zephyr sale means work for them, plumbers, steam fitters, and electricians may be used as "sub-dealers" in getting prospects for the salesmen, and in recommending Zephyr equipment in that area.

Mr. Jordan declares that the business given these plumbing and heating contractors is a powerful agent in building good will for the system in every locality where distributorships or dealerships are located.

It is because any person or organization dealing in the sale of Zephyr equipment must have complete and constant training in the technical workings of the system and in making all calculations for its installation that Mr. Jordan has elected to require all of his distributors to serve also in the capacity of retailers.

Factory Men in Charge

He believes that it is a better policy to send factory representatives to each distributorship, and there give all of its salesmen training concerning the system which may be used in selling the unit at retail, as well as to dealers, and thereby keep them in constant touch with dealer demands and installation problems, than to supply such schooling to distributor representatives who are not in close touch with retail problems, and are concerned only with selling quantities of the units to dealers.

Before any organization may assume the duties of distributor of Zephyr systems, it must first have had experience as a retailer of the equipment. No firm may become a dealer and distributor of Zephyr units at the same time.

The company believes that no distributor can give perfect service to dealers without a first-hand knowledge of the problems confronting them.

Retail Selling Experience

This same rule applies to field men: before assuming this position, they, too, must have had experience in retail selling of the equipment.

The organization requires that complete training in the engineering aspects of the system be given also to dealers and their sales staffs.

Another qualification required by the factory of prospective dealers is that they have a good record of sales of other appliances of a technical nature, before they are allowed to handle Zephyr systems.

Retailers of commercial refrigeration, household refrigeration, oil burners, and automobiles are best suited to be Zephyr dealers, Mr. Jordan says. At the present time, the greater number of Zephyr dealerships are organizations handling a line of oil burners.

Before Air Control Systems, Inc., started sales operations in the field of air conditioning, it prepared an instruction book containing detailed information on every phase of the Zephyr system, factors to be considered in figuring installation specifications, sales suggestions, and other information of a like nature.

Study Manual

Salesmen were supplied with this manual, required to make a study of it, and then to estimate the type and cost of units for the various offices and rooms in the factory at Chicago.

This work completed, meetings were held with factory engineers, where the salesmen's estimates were considered, checked, and corrected. When it was felt that the salesmen were fully qualified to discuss, sell, and specify types of units needed, sales operations were begun. This was during the early part of 1932.

Since that time, dealerships have been established in most large cities of the country, as have distributorships. The latter are given comparatively small territories, because the organization believes that they cannot handle a great many dealers.

Weekly Sales Meetings

Every distributor and dealer holds weekly meetings with his sales staff, where problems of the past week are discussed, and new methods of selling planned.

Weekly meetings are also held at the factory, where all Chicago dealers and salesmen gather with factory engineers to consider prospects' needs and new sales and installation problems.

Any contractor, plumber, steam fitter, or electrician who is responsible for making a Zephyr sale, by recommending it to a prospect, is given a short discount on every sale by the dealer in that locality.

Zephyr salesmen do not always endeavor to make large installations when the remedying of other conditions existing in the prospect's home or business establishment will do much to lessen the work a unit would have to do.

Increase Good Will

Oftentimes, for example, a Zephyr salesman will suggest a change in the color or type of window shade used in the room where the unit is to be placed, or the installation of a water spray on the roof of the room.

While such a practice often means that a smaller system will be sold instead of a large one, Mr. Jordan is confident that it increases the good will and satisfaction of the customer, and eventually brings other customers to Zephyr.

Every distributorship and dealership is equipped with Zephyr air-conditioning equipment to allow customers to see for themselves how the system functions and what its results are.

Prospect Lists

Salesmen secure prospects from lists of names of home owners and business men in their areas. The financial status of these prospects is investigated at local credit bureaus, after which the salesman starts his actual selling operations by means of personal calls, letters, and demonstrations at the dealer's place of business.

The salesmen talk "benefit" only, and use their technical knowledge—so far as the sales talk is concerned—only as a means of estimating the cost, size, type, and placement of the unit in the room.

Most of the Zephyr air-conditioning systems now in use are installed in residences, offices, and small shops, according to Mr. Jordan.

The factory sales organization suggests no definite plans for financing sales, but prefers rather to allow each dealer to handle this matter in his own way.

A description of the Zephyr air-conditioning system will be found in the Engineering Section of this issue of ELECTRIC REFRIGERATION NEWS.

FOOD STORES
RESTAURANTS
DRUG STORES
OFFICES
BEAUTY PARLORS
BARBER SHOPS
RECREATION ROOMS
CLOTHING STORES
DEPARTMENT STORES
FIVE AND TEN
CENT STORES

Built and priced so you can profit from the whole vast

AIR CONDITIONING MARKET

AIRTROL is built and priced to open up the whole air conditioning market to you. Stores and buildings that could never afford the high priced built-to-order equipment can now enjoy all the advantages of air conditioning.

Actual cooling and de-humidification for summer is produced with Airtrol by passing the air through the regular Airtrol fin tube coil, through which refrigerated cold water is circulated.

Airtrol, with new features of construction and design, built in quantities by modern methods of production, can be made and sold at a cost much lower than that of more complicated but no more efficient forms of air conditioning. Even the smallest one-room store or basement shop can pay the low price of Airtrol air conditioning.

Airtrol air conditioning is easy to sell, for it offers to the business men who are your prospects a competitive advantage that pays them high profits at low cost. It supplies all the fresh, pure air, de-humidified and comfortably cooled that will bring in more customers, who stay longer and buy more. Yet Airtrol is small, compact, and takes up little space. Largely self-contained, it can be installed quickly and easily. It offers you a very comfortable margin of profit.

Take advantage of the profit opportunity that Airtrol offers you. Write today for complete information about the unusual efficiency and remarkable construction of Airtrol, the low cost air conditioning cabinet. J. H. McCormick & Co. Works: Williamsport, Pa. General Sales Office: Chrysler Bldg., at 42nd St. and Lexington Ave., New York. Canadian Sales Representative: A. H. Simpson, 28 Yonge Street, Toronto, Canada.

AIRTROL MODEL B, CABINET TYPE

Illustrated is one size of one model—the "cabinet" type Airtrol. Airtrol is made in types and sizes to suit every need, from the private home to the large industrial plant; for retail stores and business places of any size or type; restaurants, auditoriums, schools; any place where people gather; beauty parlors and barber shops; offices and kitchens or other rooms in homes. They are inexpensive enough so that the smallest business house or office can now afford the added comfort and profit to be found in pure air, properly humidified and circulated at a comfortable temperature, winter and summer. Airtrol can be quickly, easily, inexpensively installed. Write for any additional information desired.

AIRTROL

AIR COOLERS ADDED TO WILLIAMSON UNITS

CINCINNATI—Originally built to heat, ventilate, clean, and humidify the air in homes, Williamson Air-Conditioning and DeLuxe Comfort Systems, manufactured by the Williamson Heater Co. here, may now be equipped to cool and dehumidify the air.

The systems may be equipped with ice or mechanical refrigeration equipment. Where ice refrigeration is employed in the DeLuxe system, a cabinet with a capacity of 300 lbs. to 600 lbs. of ice, comparing in height and width with the DeLuxe unit, is installed and connected to the unit with an inside canvas collar. It contains a centrifugal blower.

Ice-Melting Chamber

An ice-melting chamber, with a direct drain connection and adhesive-type removable and replaceable filters provide the remainder of the equipment for cooling and dehumidifying the air. Cooled air is circulated through the same ducts used for distributing heat in the winter.

Where mechanical refrigeration is desired, the same general type of cabinet is provided, equipped with two or three standard coils, according to the capacity required. All air returned through the system passes over the coils of the unit, which is also equipped with a sufficient number of adhesive-type filter cells to provide air cleaning.

Centrifugal Blower

A centrifugal blower, operating at a low speed, blows the air across the coils through the ducts, thus providing all rooms with clean, dehumidified, cooled air.

Williamson air-conditioning systems may also be equipped with ice or mechanical refrigeration for summer air conditioning.

600-Pound Ice Container

Provision has been made in constructing units of this group for an ice container with a capacity of 600 lbs. Air is circulated over this ice with the same mechanical blower used for circulating warm air in the winter. Addition of the ice-melting unit does not interfere with the adhesive filters installed for air cleaning.

The same space available for location of an ice container may be utilized for installation of two or three standard evaporating coils, where mechanical refrigeration is desired.

Both the air-conditioning and DeLuxe comfort systems may be equipped with automatic temperature controls for both winter and summer operations.

NATIONAL KORECTAIRE TO ADD THREE UNITS TO LINE

CHICAGO—With its organization for sales of Korectaire room coolers well established, the National Korectaire Sales Co. will introduce, before the end of the year, three new units as companion models to the one now on the market.

The unit now being sold has an ice capacity of 800 lbs. Although no definite information is yet available as to the sizes of the new units, Harry Himelblau, mechanical engineer, states that the three models will have capacities between 300 and 1,000 lbs.

The National Korectaire Sales Co. acts as national distributor of the appliances, buying them from the Watt Mfg. Co. of Sterling, Ill. Sale of Korectaire units was started in April of this year.

Sales agents have been located in most of the country's larger cities, the distributor maintaining its own staff of retail salesmen in the Chicago area.

Most sales of Korectaire room coolers are made through ice and utility companies, according to Edward T. Blaker, general manager. These organizations either sell the unit outright, or supply Korectaire sales agents with names of good prospects. Names of other prospects are secured from Korectaire users.

No actual door-to-door canvass is made for prospects, Mr. Blaker says, because his firm considers it a waste of effort. The company does no great amount of circularizing, but chooses rather to send literature to prospects only when the latter show considerable interest in room-cooling equipment.

Korectaire salesmen are given thorough training in the construction and operation of the unit, but are urged to make their sales talks non-technical.

In every city where there is a Korectaire agency, installations of Korectaire room coolers have been made in showrooms to enable salesmen to demonstrate the appliance to prospects.

AIR CONDITIONING CORP. OF NEW JERSEY MOVES OFFICE

NEWARK—The Air Conditioning Corp. of New Jersey has moved into temporary offices at 380 Central Ave. This firm was organized to handle the new General Electric oil burner.

Lambert Dorflinger, Montclair, N. J., is president of the newly incorporated firm; William Dorflinger, Madison, N. J., vice president; David Green, Newark, secretary-treasurer.

President Dorflinger recently resigned from General Electric Co. appliance division, after a service of 17 years.

AIR CONDITIONER PAYS WAY TWICE IN ONE SEASON

WORCESTER, Mass.—Air-conditioning equipment which paid for itself twice during one season's operation is reported by Gilbert & Moffett, candy wholesaling company which installed a V-1 Frigidaire air-conditioned unit in its storage room last spring.

Hitch your wagon to THE STAR

IN 1931, Kelvinator dealers sold more Kelvinators than in any of the preceding 16 years. *And this year, they are selling more than they did last year.* Every month of 1932 has been bigger and better than the corresponding month of 1931.

Sales of the higher priced *fully* automatic Models have increased steadily. For the first quarter, they *actually outsold* the lower priced semi-automatic Models—proving that people *do* want *fully automatic operation,* with nothing to remember or forget. And every day more and more people are finding out about fully automatic operation. *Which means more sales for Kelvinator dealers because Kelvinator alone is fully automatic.*

Dealers, too, are flocking to Kelvinator. In the first six months of this year, *1,733 new dealers* have come with Kelvinator.

Kelvinator's 18th year in the industry has been a great year —the forerunner of many more—because Kelvinator is building on the *bedrock of quality.*

Progressive merchants are invited to write for information regarding the Kelvinator Full-Profit Agreement . . . KELVINATOR CORPORATION, *14245 Plymouth Road, Detroit, Michigan. Kelvinator of Canada, Ltd., London, Ontario. Kelvinator Limited, London, England.*

☆ ☆ **Kelvinator** (578) ☆ ☆

Railroads Active in Pre-Cooling and Conditioning Pullmans

Colored Porter First to Pre-Cool B & O Cars with a Standing Cart of Ice

By Margaret M. Thompson

DETROIT—An old colored man who filled the ice water coolers of the midnight Baltimore & Ohio train running from Baltimore to New York, was responsible for giving the idea of pre-cooling trains to the Baltimore & Ohio engineers, according to E. J. Gleason, division passenger agent here.

In the course of his duties one night, the employe chanced to leave a wagon-load of ice outside the window of one passenger who was sweltering from the summer heat. A slight breeze blew over the ice and cooled the passenger. So he brought another load of ice and placed it at another window to cool off some of the others in the train.

This system of cooling was reported to C. W. Galloway, vice president in charge of operation and maintenance of the Baltimore & Ohio lines, who conceived the idea of cooling the cars, and with other B. & O. engineers started experiments that resulted in the air-conditioned cars of today.

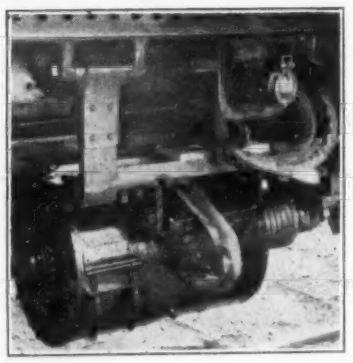
B. & O. Experiments of 1929

In 1929 the B. & O. engineers fitted up a coach and experimented with it during that summer. From these experiments they gained sufficient information to equip, in April, 1930, the dining car "Martha Washington." On May 24, 1931, the B. & O. put into operation the first completely air-conditioned train in the world, "The Columbian," running between Washington and New York. This train was made up of parlor cars, coaches and diners.

On April 20, 1932, the "National Limited," running daily in both directions between New York, Philadelphia, Baltimore, Washington, Cincinnati, Louisville and St. Louis, was made up entirely of fully air-conditioned cars. The next month, "The Capitol Limited," operating daily between New York, Washington and Chicago, was likewise air conditioned throughout.

The principal innovation on the "National Limited" and the "Capitol Limited" was the application of air conditioning to sleeping cars, which presented the major problem of circulating the conditioned air to berths, compartments, and sections.

Third-Brush Generator



Development of the third-brush generator eliminated the gas engine.

In July of this year the "Alton Limited," express running between Chicago and St. Louis, made its first trip as a completely air-conditioned train, making the number of Baltimore & Ohio cars equipped with air-conditioning machinery number 133.

"The George Washington" of C. & O.

"The George Washington," first completely air-conditioned train to be put in service by the Chesapeake & Ohio Railroad, took its first trip from Washington to Chicago, April 24, 1932.

The train was on exhibition for two days previously in the Union Station in Washington, with guides on hand to explain the air-conditioning system. The train is furnished throughout in a colonial fashion, with colonial prints on the walls of the club and dining cars. Cars are named after persons or places famous during Revolutionary days.

All night Pullmans on Illinois Central trains from Chicago to St. Louis are now air-cooled, installation of the equipment beginning June 25, 1932. The "Daylight," Illinois Central day train from Chicago to St. Louis, is air conditioned, and two companion trains, "The Michigan Boulevard," afternoon train, and "The Diamond," night train, are pre-cooled.

N. Y. C. Pre-Cools

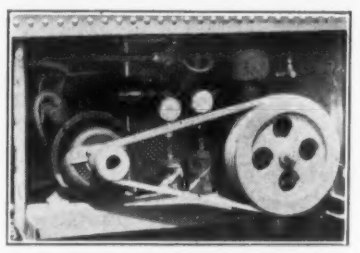
All New York Central trains originating at the terminals in New York, Buffalo, Cleveland, Detroit, Pittsburgh, Chicago, Cincinnati, Indianapolis, and St. Louis are treated to the pre-cooling process. The dining cars on the principal trains are air conditioned.

Announcement has been made from Union Pacific headquarters in Omaha that all dining cars used on either the San Francisco Overland or the Los Angeles Limited are fitted with air-conditioning systems. Not only are all regular dining cars fully equipped but enough extras also to make it possible to have this service daily.

Ten dining cars equipped with the Carrier steam system of air conditioning have been placed in operation by the Atchison, Topeka & Santa Fe Railroad on their transcontinental trains running through the west and the southwest. The dining cars have been made sound-proof, and all windows sealed so neither sound nor dust will enter the cars.

More than a year ago the Santa Fe inaugurated the first transcontinental air-conditioned dining car on its crack train, "The Chief." It was the success of this air-conditioning system in maintaining uniformly comfortable conditions during the heat waves of the past two summers, even across the burning Mojave Desert, which, company officials says, decided them to air condition the 10 additional dining cars.

Belt-Driven Compressor



One of the B. & O. systems drives the compressor by belts.

Cars coming in at the Pennsylvania terminals are pre-cooled as in the New York Central stations.

York Equipment

The equipment installed on the Baltimore & Ohio lines is by the York Ice Machinery Corp. of York, Pa., and was designed by the Baltimore & Ohio engineers and the engineering department of the York Ice Machinery Corp.

On the first B. & O. cars that were air conditioned an independent 10-kw. generator driven by a small high-speed gas engine was installed on each car, and since ammonia seemed to be the most practicable refrigerant at the time, it was adopted. In order to keep the fumes of the ammonia from the car, brine was used as a refrigerant, a separate brine cooler being used and the brine being pumped through a cooling unit in the top of the car.

Third-Brush Generator

The elimination of the gas engine was solved by the development of an entirely new design 7½-kw—third brush type generator driven by a specially designed combination belt and gear drive from the axle of the car. This third brush generator is of such capacity that it at all times furnishes sufficient power for operating the air-conditioning equipment, and at the same time furnishes the additional current to the storage battery, so that the air-conditioning equipment can be operated for pre-cooling, before the car leaves the station, and also at all times whether the car is in motion or standing in the station.

F-12 is the refrigerant used in this system. It is possible to expand this refrigerant directly into the cooling unit located generally in the upper deck of the cars, and this eliminates the necessity of the brine-cooling tank under the car, and the pump for circulating the brine, and also makes it possible to reduce the time necessary for pre-cooling the car previous to dispatchment of trains.

Same Compressor

The same type compressor as was used the year before, only slightly larger, is used for compressing the refrigerant and is driven by flexible belts from a motor.

This combination of an axle-driven generator and high capacity storage battery runs the air-conditioning system on the Columbian, Capitol Limited and National Limited and all dining cars on this line.

The Pullman system, in use on the Chesapeake & Ohio train, "The George Washington," and on the Union Pacific lines, is one in which the axles of the dining cars are geared for driving a propeller shaft, fitted with magnetic clutch attached to the compressor.

In addition to the compressor, the major equipment involved for cooling the air consists of an air-cooled condenser underneath the car, with a cooling coil overhead in the roof, with the latter in series with blower fans, air filter, intake ducts for fresh and recirculated air, and outlet ducts for distribution of the conditioned air into the car. The refrigerant is F-12.

The compressor is connected by belts to a special electric speed control which is driven through a Universal drive shaft, from a gear drive on the adjacent truck axle.

The electric speed control functions on the principle of electric induction, and starts the compressor when the train reaches a speed of five miles per hour, and then increases the speed of the compressor up to a maximum of 420 r.p.m.

Predetermines Speed

Regardless of high train speeds thereafter, the compressor continues at its predetermined speed. For power when the cars are standing still, a separate motor is provided. This is belted to the speed control.

When heat is required in the car, the refrigerating machinery ceases to function and steam vapor from the steam trainline is circulated through the overhead heating coil. Filtered warm air is forced over this heated coil into the distribution ducts.

In the Carrier system which is in use on the Atchison, Topeka & Santa Fe Railroad and also on some of the Union Pacific cars, steam from the engine is employed as the energy in a vacuum refrigeration system.

F-12 in Illinois Central System

F-12 is the refrigerant employed in the Westinghouse system which is in use on the Illinois Central Chicago-St. Louis trains. A gear-driven direct-current axle generator supplies each car with sufficient power for lighting and battery charging in addition to that needed for operating the air-conditioning system. The electrical control is so arranged that it produces constant voltage at any train speed between 20 and 90 miles per hour.

The cooled air is sent through fin-type pipes overhead in the car, and issues from openings in the ceiling surfaces. This equipment may be used during the winter for heating purposes.

While the train is enroute the motor operates from railway batteries. By a special arrangement, however, the cars may be cooled before a run by plugging the alternating current motor in on the 220 or 440-volt alternating current supply available in the yards.

Uses Ice Water

Still another system was used to refrigerate a coach on the Boston & Maine Railroad which made its initial run on Sept. 9, 1931, between Boston and Troy, N. Y.

The method adapted for cooling and conditioning this coach was somewhat different than present accepted practices in that the medium of refrigeration was circulated ice water, cooled by being sprayed over ice carried in bunkers beneath the coach.

A pre-cooling system instead of a complete air-conditioning system is being employed in the coaches of some of the railroads. The New York Central lines use the Carrier pre-cooler which has melting ice as the cooling medium. The cooling units are portable, mounted on trucks which can be wheeled to the car to be cooled, or, if more convenient, can be kept at a fixed point and the cars brought to it.

This pre-cooler consists of an ice-melting tank, an Aerofin cooling coil, and pump and fans all mounted in a water-proof, cork-insulated steel casing.

Westinghouse Generator

* * *

EAST PITTSBURGH, Pa.—This 15-kw. gear-driven axle generator, the first of its kind, is shown on test in the local works of the Westinghouse Electric & Mfg. Co. Two units have been sold the Pennsylvania railroad to furnish increased axle generator capacity.

Ten similar units are being supplied the Illinois Central Railroad as part of air-conditioning equipment for passenger cars. Although not appreciably larger, it has three times the output of the ordinary axle generator, and provides ample capacity for air conditioning, car lighting, and battery charging.

Ruthenburg Traces History of Air Conditioning; Explains Development

MT. CLEMENS, Mich.—"Air conditioning, which has but recently become a part of the general public consciousness, has beginnings which go back so far that they are lost along with the traces of the earliest dwellers in caves, tents and primitive shelters," states Louis Ruthenburg, president, Copeland Products, Inc., and chairman, Refrigeration Division of the N.E.M.A.

"The Romans, who were engineers and builders, might well have been expected to be first to provide for ventilation in their buildings," Mr. Ruthenburg said. "They provided special openings in the roofs of their structures to provide for the escape of air. This arrangement, however, was not to provide a fresh air supply for the buildings, but to permit the escape of the heated air in warm weather. However, ventilation, unquestionably, must have been an accidental feature.

Mine Ventilation

"Apparently the first recognition of the need of fresh air came from the necessity of securing a supply of fresh air in mines. It was this feature that called attention to the necessity of ventilation independent of heating."

The first buildings to be provided with ventilation in England and the United States were the meeting places of legislative assemblies, Mr. Ruthenburg points out.

"Ventilation, it may be said for purposes of mutual understanding, has for its object the maintenance of a supply of pure air indoors. This can be accomplished only by bringing fresh air into the building and removing the impure air, two functions that go together.

Removal of Dust

"An important feature of ventilation is the removal of dust. In modern plants and many buildings, dust is removed from the air by washing with sprays and then removing the excess moisture from the air.

"In some plants the humidity is maintained at any desired percentage by automatic regulators, called humidistats, which control the amount of moisture as thermostats control the amount of heat. Air too moist is dried and air too dry is moistened by spraying with water. Also, in the process of washing, nearly all the bacteria are removed, a very important factor for health."

Contrary to age-old custom and belief, ventilation through open windows is not effective so far as introducing fresh air is concerned, declared Mr. Ruthenburg. It does, however, assist in regulating temperature and to some extent aids in controlling humidity.

"In modern structures ventilation is accomplished by the positive mechanical means of fans and blowers. The latest systems are designed so as to be effective with the windows open, thus eliminating the objections to keeping windows closed, raised by many people.

Bad Effects

"The bad effects of poor ventilation are high temperature and lack of circulation. It is desirable to supply each person in a room with 30 cu. ft. of fresh air per minute, or 1,800 cu. ft. per hour.

"Ventilation is grouped into two classifications: gravity and mechanical. Gravity ventilation is based on the fact that warm air, which is lighter than cold, rises and cold air descends. However, in warm weather the difference in the temperature of the inside air and the outside air is so slight that very little ventilation results.

"Mechanical ventilation utilizes machinery for the movement of the air. It may be used either to introduce fresh air, to remove foul air, or both. The most generally used equipment is fans or blowers placed in the air ducts, which either force the air ahead of them or create a vacuum into which it rushes. The method of blowing the air in is known as *plenum*, and that of sucking out the air is known as *vacuum*.

"The first applications of cooling and dehumidifying air were large installations in theatres, office buildings and large stores.

Equipment in Demand

"The demand for cooling air in hot weather has increased so that air-cooling appliances are being provided for small business places, offices, restaurants, homes, and even for railway cars.

"Increasing interest is being manifested in cooling homes. It is not necessary to cool the entire house. That, obviously, is quite expensive, and unless the home has been built with air cooling especially in mind any method of attempting to cool it would be highly inefficient, due to escape of the cooled air because of improper design, insulation, and construction.

"One type of cooling equipment for homes that is coming on the market is known as spot cooling. That is, cooling units are located in the room or rooms, or other space, that is to be cooled, such as the library, dining room, living room, or bedrooms. It is not always necessary to cool bedrooms, as there may be sufficient currents of air by retiring time to make them comfortable.

"In cooling residences, it is not necessary to cool all rooms at the same time. The dining room would be cooled only at eating time. The den, library or living room would be cooled only when they were to be used. And the bedrooms only at night.

Cooling Optional

"The optional cooling of rooms is made possible by controls which enable one to switch the refrigeration to the rooms desired. All cooling units in the rooms are, of course, connected to one central condensing unit which operates this equipment.

"As to costs, these will naturally vary according to the size and nature of the installation, and may well run from $1,000 to $10,000. The same variations will occur as with the heating systems, except that it is a more costly process to cool than to heat.

"Costs will come down with the development and growth of the industry," Mr. Ruthenburg believes, "as in all other lines. As the general public comes to demand cooling in summer as it has been educated to demand heating in winter, costs will be decreased as efficiency of design of equipment, construction of buildings, and other factors involved increase."

NEW YORK CENTRAL BUYS PRE-COOLERS FOR TRAINS

DETROIT—Carrier equipment for pre-cooling Pullman cars and coaches on important trains has been purchased by the New York Central Railway Systems, and units have been placed at stations in nine cities through which New York Central trains run.

Each unit has a capacity of 1,000 lbs. of ice, and is placed on a truck which may be rolled to the side of the coaches while the train is standing on the platform.

Water from the melting ice is pumped through a radiator type of cooling unit which fits the window of any train coach. The pump is driven by a ½-hp. motor.

Having passed through the cooling unit, the water flows back toward the ice container and is forced out in a spray onto the ice. The air, circulated by a blower operated by a ¾-hp. motor, passes first through this spray, and then across the radiator before entering the coach.

Passage through the spray and across the radiator tends to dehumidify the air. As the cooled air enters one window of the coach being cooled, warm air passes out through another window. Only two in the car are open when it is being pre-cooled.

The units are plugged in on the a. c. current available at the stations.

Although it has not yet been determined as to what temperature the equipment will cool the coaches, or what temperature will be set as a standard, one Pullman porter remarked recently, after a car had been cooled, that "he had to go outside to get warm."

Cooling operations are speeded by using one unit to cool each coach while the train is stopped at the platform.

Twenty-five of the units are in use at the Michigan Central station in Detroit. Other similar systems are being employed at New York Central stations in Cincinnati, St. Louis, Cleveland, Buffalo, Chicago, New York City, Indianapolis, and Pittsburgh.

FAIRBANKS, MORSE & CO. BUILDS TRAIN GENERATOR

CHICAGO—Fairbanks, Morse & Co. has developed motors and generators designed expressly for a railroad passenger-car air-conditioning system.

Generators are driven from the car axle and are of the third brush type, having a nearly flat voltage characteristic over a wide range of car speeds. Cast steel frames and housings are used on the generators in order to secure minimum weight and diameter consistent with strength requirements.

A low-voltage system is used throughout in order to avoid interference with the usual car-lighting system, and each car is independent of the others for flexibility of operation. A large storage battery reserves sufficient capacity for approximately 1½-hr. operation for pre-cooling.

8 DETROIT THEATERS ARE AIR CONDITIONED

By Elston D. Herron

DETROIT—Installation of a 100-ton Brunswick-Kroeschell system in the Eastown Theater here brings to 1,675 the total tons of refrigeration used to cool and dehumidify the air in eight Detroit theaters operated by the Publix-Michigan Theaters, Inc.

Brunswick - Kroeschell refrigerating equipment is used in all of the movie houses except one—the Michigan Theater, which is cooled by a Wittenmeier system.

The theaters and refrigeration tonnage used by each are as follows:

Michigan Theater, 360 tons; United Artists Theater, 185 tons; Paramount Theater, 245 tons; State Theater, 200 tons; Riviera Theater, 125 tons; Eastown Theater, 100 tons; Ramona Theater, 100 tons; and Fisher Theater, 360 tons.

B-K Equipment Installed

Installation of Brunswick-Kroeschell equipment was made in the Eastown Theater in June. The installation was made by the Detroit branch of the Carrier Corp.

This particular installation makes use of the down-feed ventilation system used in the theater before the cooling system was installed, by which air is forced into the theater through openings in the main and balcony ceilings, and is drawn off through mushroom-type openings in the floor of the theater.

Water Spray Cooling

A Brunswick - Kroeschell carbonic compressor with a capacity of 100 tons of refrigeration (air-cooling rating) is located beneath the stage of the theater, and cools by direct expansion the coils of the air-washer in the attic. The compressor is driven by a 100-hp. synchronous motor, using primary current at 4,600 volts. The condensers are water-cooled.

Water sprayed in two banks and in a spray header over the coils is the agent by which all air for the theater is cooled.

Some Exhaust Air Used

Not all of the air forced through the ceiling openings, however, is first routed through the washer. This is due to the fact that some of the air, after being exhausted, is by-passed directly to the supply fan, to be recirculated without being passed through the cooling unit.

Other air, after being drawn from the theater by the exhaust fan, is forced out of the theater, while still another duct is used to return a part of the air back to the entrance of the air washer for treatment. In addition, a part of the air conditioned by the washer comes directly from the outdoors through an opening in the attic.

Damper Regulators

The amount of air supplied to the air-washer and supply fan is automatically regulated by dampers, according to A. C. Wallich, branch manager of the Carrier organization.

This arrangement of various air supplies permits cooling to the required temperature under almost any condition, says Mr. Wallich, since air which has not been cooled can be mixed with cooled air in the proper proportion at the supply fan's outlet to give the desired temperature in the room.

Mixture of Air

On extremely warm days, most of the air will be cooled before being forced into the theater through the ceiling openings. On mild days, only a relatively small amount of cooled air need be mixed with warm air to secure the desired temperature, the manager explains.

The system supplies approximately 75,000 cu. ft. of air per minute to the theater. American Blower fans are used for both supply and exhaust purposes in the system.

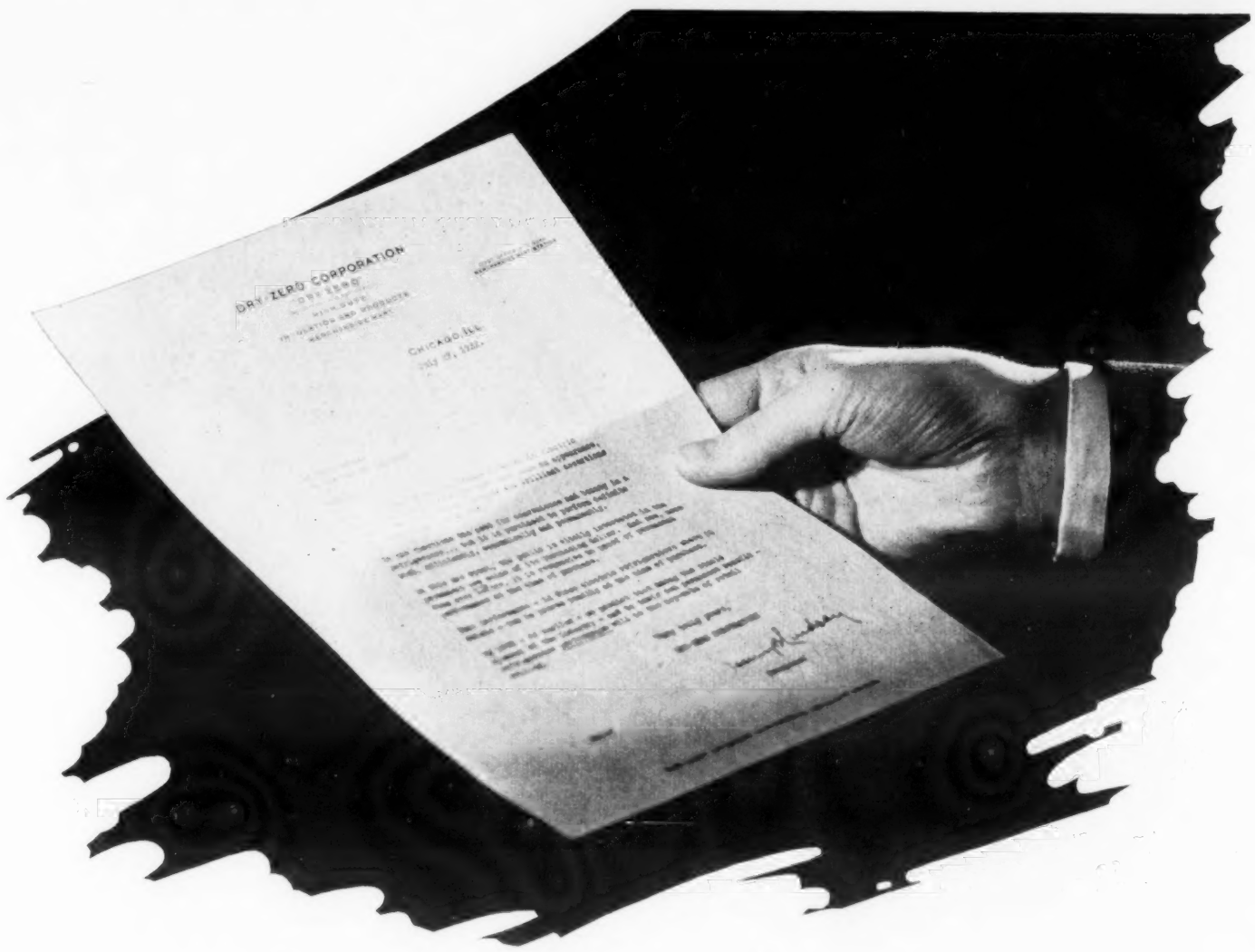
According to J. Watson of the Publix organization, the installation of the system has attracted many more patrons this season than have ever attended the theater in past summers. He estimates that the cost of operating the system is $2 to $3 per day.

BAKER EQUIPMENT USED IN COLUMBUS, OHIO, HOTEL

COLUMBUS, Ohio—Baker air-conditioning equipment has just been installed in the coffee shop and dining room of the Chittenden Hotel here. The space cooled is approximately 40,000 cu. ft., and the occupancy load of the two rooms is 200 persons.

A Baker F-6-A refrigerating unit, using methyl chloride, is used in connection with Trane finned coils in the air stream. This equipment makes up the second stage in the cooling apparatus, the first being additional Trane coils through which cold water from a deep well is circulated.

Approximately 5,400 cu. ft. of air is handled per minute.



An open letter to the entire Industry

- From the time competition became a factor in electric refrigerator selling, sales have been made largely on appearance, novelty features, names, slogans and brilliant assertions of superiority by everyone.
- No one questions the need for convenience and beauty in a refrigerator . . . but it is purchased to perform definite work, efficiently, economically and permanently.
- In this new epoch, the public is vitally interested in the permanent **use** value of its purchasing dollar. And now, more than ever before, it is responsive to proof of permanent performance at the time of purchase.
- Such performance—in those electric refrigerators where it exists—can be proven readily at the time of purchase.
- By 1933—or earlier—we predict that among the stable element of the industry—and to their own permanent benefit—refrigerator **performance** will be the key-note of retail selling.

Dry-Zero Corporation, Merchandise Mart, Chicago, Illinois
Canadian Office—677 Broadview Avenue, Toronto

THE MOST EFFICIENT COMMERCIAL INSULANT KNOWN **DRY·ZERO**

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Published Every Week by
BUSINESS NEWS PUBLISHING CO.
Also publishers of REFRIGERATED FOOD NEWS (monthly) and REFRIGERATION DIRECTORY and MARKET DATA BOOK (annual)
550 Maccabees Building, Woodward Ave. and Putnam St.
Detroit, Michigan. Telephones: Columbia 4242-4243-4244

Subscription Rates:
U. S. and Possessions and countries in Pan-American Postal Union: $3.00 per year; 2 years for $5.00
Canada: $6.00 per year (U. S. Money)
All Other Countries: $4.00 per year; 2 years for $7.00
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VOL. 6, NO. 49, SERIAL NO. 177, PART 1, AUG. 10, 1932

Air Conditioning

AIR conditioning today is in the patent medicine stage. It is being widely advertised as a panacea. Almost everybody seems to think it will cure the depression. It is also variously described as a remedy for hay fever, inefficiency, insomnia, irritable patrons, asthma, befuddled thinking, explosive bosses, and skin eruptions.

One usually associates patent medicines with quacks. And there are those who believe the chaotic air-conditioning business (it hasn't yet attained the rank of an "industry") has its full quota of charlatans and mountebanks. Certain it is that few engineers or manufacturers seem to agree as to the types of equipment which deserve the name, "air conditioning."

Air conditioning in its fullest sense includes cooling, heating, circulating, cleaning, dehumidifying and humidifying the air. Systems are now on the market which accomplish all of these functions, while others are designed to accomplish only one or a part of them. A few manufacturers will add to their equipment a mechanism for ionizing the air, at a small extra cost. One company features air-conditioning equipment with a device for absorbing all noise from the air entering a room.

Most of the electric-powered air-conditioning equipment now on the market is constructed to cool, dehumidify, and circulate room air. These three functions are also performed by the majority of ice coolers now being merchandised. Both types of equipment clean the air in varying degrees, depending upon their design—some using filters for removing foreign matter from the air, some cleaning it by the washing process, and others embodying both types of air-cleaning. At additional cost, some systems may be designed to heat and humidify the air in winter.

Sizes and styles of air-conditioning equipment vary widely, from small fans and portable ice coolers which cool and dehumidify the air in office or home rooms, to the giant central systems employed to condition the air in theaters and large buildings.

Small electric systems of air conditioners, used chiefly for cooling, circulating, and dehumidifying the air, are those direct expansion and cooling systems that employ suspended or cabinet type cooling units which condition the air by blowing it across the cooled coils. In systems of this type, air is sometimes cooled to a limited extent by circulating city water through the coils, across which air is blown. Some manufacturers use only the suspended type cooling units, others use only the cabinet type, and still others use both.

Several schemes are being tried by manufacturers of ice coolers. In some units, air is blown directly over blocks of ice in the cooler. In others, the air is passed over both the ice and the fins upon which the ice rests. Other units provide for a spray over ice blocks, the air cooled by being blown through the cold water. Another system requires that ice be placed in a large melting tank, the resulting cold water being circulated through coils which provide the air-cooling surface.

Large installations are of two principal types. In a central system, all air is cooled, dehumidified, cleaned, and is then blown by fans through a central outlet in the room, or through ducts which carry the air to various points throughout the room or rooms. The unit system utilizes a large condensing machine which can be installed in a basement, with one or more cooling units (in the area to be cooled) connected to it.

Central systems which heat and humidify the air in winter, as well as cool and dehumidify it in summer, vary widely in design. One type of system forces steam from the basement boiler to the coils of the cooling unit, the air being blown across the coils and into the room. In another system, hot water is pumped through the coils to furnish heat as the air is blown across them. A rather common plan is that of using a forced warm air system for heating, with cooling coils installed in the air ducts for use in summer cooling. In some instances, ice coolers are being used to refrigerate the air in connection with equipment such as the last mentioned.

Devices are also being manufactured for use in circulating, washing, and filtering the air in heating systems. Several manufacturers are producing portable humidifiers. One company is making a portable air washer. Many instrument manufacturers have announced new humidity controls for use with complete air-conditioning systems.

Air-conditioning equipment is now adaptable to almost every type of structure. While it has been installed to a limited extent in homes, air conditioning has found its most receptive field that of business establishments. Hospital rooms, tea rooms, barber shops, dentists' and doctors' offices, conference rooms, offices, dress shops, department stores, restaurants, beauty shops, undertaking parlors, theaters, fur stores, millinery shops, clothing stores, dairies, and other commercial enterprises are among today's best customers.

Manufacturers of air-conditioning equipment are, in most instances, merchandising their product tnrough established specialty distributors and dealers who have established new departments, with separate sales staffs, to specialize in sales of air conditioners.

Most manufacturers are insisting that before any man goes into the field as a salesman of air conditioners, he must first be thoroughly schooled in the construction, principles, capacities, and functions of the system.

Salesmen must be capable of acquiring and using this knowledge when it is needed, without making their sales talks scientific discussions which services only to confuse the average prospect rather than develop his buying urge. Nine prospects out of 10 are said to know little and care less about humidity, air circulation, or dry bulb temperatures. They know only that they want to be made comfortable.

Some distributors require their salesmen to submit all specifications to staff engineers for checking and approval before quoting prices and installation particulars to prospects. Others leave this work entirely in the hands of their salesmen. Still others—those who believe that any detailed technical training will detract from the "selling" qualities of the salesman's presentation—send their staff engineers to make all estimates, and leave to the salesman only the task of "straight selling."

The above analysis of types of air-conditioning devices and methods of selling them may give some idea of the state of flux in which the assemblage of manufacturers and merchandisers of such equipment now find themselves.

That the industry will progress fast and far nobody seems to question. It is being given a big impetus just now by the railroads, many of which have installed comfort-cooling equipment on Pullman cars and diners to recapture lost business. People who ride on these trains invariably seem to be struck with the idea, and their curiosity on the subject is partially satisfied by trainmen who have been educated on the subject.

It hasn't often occurred to patrons of refrigerated theaters and restaurants that they could obtain the same effects in their homes. The thought has occurred, however, to passengers on air-conditioned trains. And the demand seems to be growing apace.

Established distributors of electric refrigeration equipment will do well to identify themselves with this new type of specialty product while the industry is still in the process of formation. Profits appear in the offing.

Kind Words from Readers

Rex Mfg. Co.
Connersville, Ind.

"Your publication is doing a wonderful service for the refrigeration industry, and the industry is fortunate in having such an aggressive, up-to-date organization promoting the interests of the refrigeration industry through your most valuable paper."

C. C. HULL,
President.

"Please send us at your earliest convenience 25 copies of ELECTRIC REFRIGERATION NEWS for June 29 containing all the specifications of various makes of household electric refrigerators.

"I think this is about one of the finest things that we have had for a long while, giving us complete detailed description of all makes. The boys are very anxious to have these at the earliest possible moment."—W. B. Ward, Portland Sales Corp.

"This publication fulfills the service man's need and keeps him up to date."—Alfred Dill.

"In your issue dated June 8 is an article very interesting to us since it shows conclusively the practicability of the thing we have long urged on various manufacturers in the industry—the active promotion of the sale of accessories by their distributors. We should like very much to have 20 copies of this issue if possible."—H. C. Clappison, The Inland Mfg. Co., Dayton.

"In a game that is being played as fast as the refrigeration business, I don't want to miss a single issue of your valuable magazine."—Leonard Warden, 122 East Ninth St., Cincinnati.

"We would appreciate very much a sample of your paper. We are distributors for the Servel and the Baker ammonia machine and we believe we need your magazine in our work."—A. W. Smith, President, Smith Elevator & Mfg. Co., Inc., Chattanooga, Tenn.

"Your magazine is *excellent*."—G. W. Gail, Ruxton, Md.

"We were recently handed a copy of ELECTRIC REFRIGERATION NEWS and we were very interested in same. Will you kindly advise us what your subscription price is."—E. B. Ferris, Uebler Milking Machine Co., Inc., Vernon, N. Y.

"We are of the firm belief that it (ELECTRIC REFRIGERATION NEWS) is indispensable to the trade."—O. M. Williamson, sales manager, Benton Distributing Co., Columbus, Ohio.

"There is no question in our minds but what your trade paper is the liveliest trade paper in the merchandising field."—W. D. Hostetler, Refrigeration Dept., Sunset Electric Co., Portland, Ore.

"Will you kindly send me two copies of ELECTRIC REFRIGERATION NEWS of March 30, as there are a few articles that you have written up in this issue that I think will be helpful to my salesmen? I am a subscriber to your magazine and find it very helpful to my refrigerator business."—Fred Nanamaker, Everybody's Radio & Fix-It Shop, New Haven, Conn.

"We seem to have lost our copy of ELECTRIC REFRIGERATION NEWS of Feb. 24, 1932, and would like to have you send one or two copies as it is a very important number for us. We enjoy the NEWS very much."—J. A. Stewart & Son, Columbia, Mo.

"We believe your NEWS will be of value to us in our contact and research in the refrigeration field of the Seattle market."—Frank Parrish, Jr., W. W. Chew Organization, Seattle, Wash.

"We feel that we could not keep on selling electric refrigerators without knowing just what other distributors are doing and there is no other journal that can give us the information that we get out of REFRIGERATION NEWS.

"I would like very much to have you send me by special delivery immediately at least six copies of the latest issue in which you show a comparison of the various makes of refrigerators. We need these for our salesmen and know that they will be of great help to us in comparing the refrigerator we sell with other makes which are sold in this territory."—H. M. Johnson, advertising manager, The Swords Co., Rockford, Ill.

"We are enclosing herewith our check for $3.50 to cover subscription to ELECTRIC REFRIGERATION NEWS and REFRIGERATED FOOD NEWS.

"We certainly would not care to be without the weekly visit of both of these publications."—R. E. Frederick, president, Standard Refrigeration Co., Inc., Philadelphia.

"We are the Norge distributor for southern Alberta, and find the copy we have seen of your paper very interesting."—S. W. Caldwell, H. R. Carson, Ltd., Lethbridge, Alberta, Canada.

"I might say that we have today received our first issue of May 18 on our new one-year subscription, and the information contained in it is just what the jobbers and dealers of refrigeration have been looking for."—J. C. Moore, Moore, Bird & Co., Denver.

"Please send us all the back numbers we did not receive, as we are looking forward to the May 18 issue carrying detailed specifications of refrigerators."—F. A. Osborne, Faris-Osborne Co., Fresno, Calif.

"We find the publication very helpful in keeping us posted on new developments and general activities of electric refrigeration."—B. M. Fast, The Utility Management Corp., New York City.

"I have found your magazine very interesting and have kept many numbers for special reference."—G. B. Rousseau, M. E., Montreal, Que., Can.

"Have just recently been appointed as a Frigidaire dealer and am desirous of securing all the data possible to enable me to get the latest news from the refrigeration world. Having seen your June 15 issue, I feel that it would benefit me to subscribe to the paper."—Wilmer N. Brown, Alhambra, Calif.

"We find that prospects this year are requiring more detailed information in regard to refrigerators than ever before, and we expect to make good use of these extra copies for that purpose."—D. A. Middleton, new business manager, City Light & Traction Co.

"Permit me to offer my congratulations to you in getting out so splendid a magazine in the interest of those who are promoting refrigeration with the idea of high grade sales methods and quality products."—Frank D. Bates, Philadelphia.

"The writer is a field representative for Klein Stove Co., selling Leonard electric refrigeration and also a subscriber to your excellent paper. I find it an invaluable source of all sorts of information pertaining to refrigeration."—Adolph Seidensticker, Philadelphia.

"We have just received our copy of the REFRIGERATION DIRECTORY and want to congratulate you on the completeness of this publication."—N. W. Sieber, advertising manager, Continental Fibre Co., Newark, Del.

"The writer always enjoyed the NEWS, and is looking forward to the first issue."—W. L. Werner, manager, Consolidated Industries Dept., Taylor & Pearson, Ltd., Edmonton, Alberta.

"Please send me 10 copies of the May 18 issue of the REFRIGERATION NEWS carrying specifications on all makes of refrigerators. Surely think this is a splendid idea. It is a big help to the entire industry."—W. T. Smith, Sparton Refrigerator Sales Co., Chicago.

"We have been trying to secure specifications on various refrigerators for some time and through our receiving your sample copy of ELECTRIC REFRIGERATION NEWS of May 11, we found out that we will be able to secure this valuable data from your next edition."—Frank M. Krebs, president, Krebs Service, Inc., Michigan City, Ind.

Too Many Small Dealers

Mayflower Electric Refrigeration
New York City
July 29, 1932.

Editor:

Your editorial of July 27 is very interesting, and the writer sincerely believes that this editorial will be accepted throughout the industry as a statement of plain facts.

Should a national convention be called for all executives and field representatives engaged in the electric refrigeration industry, the theme song would probably be "Bring Back the Good Old Days" of 1930 and 1931; and in a large measure, the so-called "old timers" would have reason to chant; the "newcomers" would probably join in the chorus even though they have yet to taste fruitful profits of their undertaking.

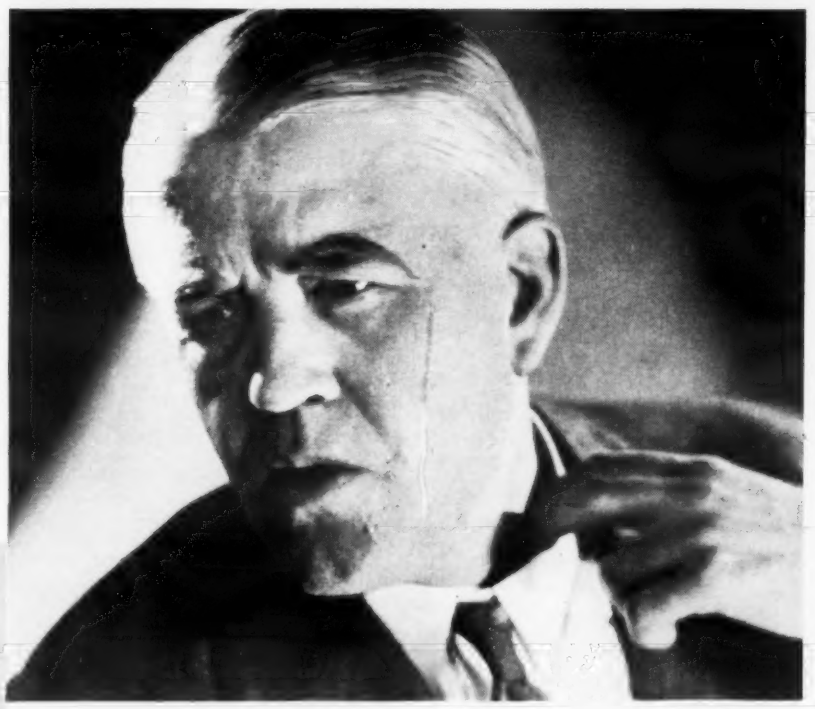
During the past three years that I have been in charge of the New York metropolitan territory for Mayflower electric refrigeration, I have seen a great many changes take place in the industry, notable among which is the increasing number of dealers handling electric refrigeration and the constant changing of lines by these dealers.

Without doubt, there are too many small-time dealers handling electric refrigeration, and it would therefore seem advisable for those manufacturers who expect to maintain their place among the leaders to expend their efforts in creating a dealer organization of large and well established concerns, rather than devote much of their time and money in attempting to control a large number of small, inexperienced accounts.

C. H. GRANDSTAFF,
Regional sales manager.

DON'T SUFFER FROM STIFLING HEAT AND HUMIDITY...

Turn on the cold



New Frigidaire Air Conditioning Unit cools and dries the air in summer—heats and moistens the air in winter

Hot, stifling, oppressive days—sultry, sweltering, sleepless nights! How much longer will you put up with them—go on letting them spoil the most delightful season of all? Why not end summer-time discomfort with a Frigidaire Refrigerated Air System?

A flick of the switch—and it changes sultry, sticky heat into delightfully cool, dry air! The Frigidaire System actually *refrigerates* the air—*just as your household Frigidaire does*, using the same efficient, time-tested type of cooling unit. And furthermore, it removes excess *humidity*, which makes heat so oppressive.

In winter, the same equipment, when connected with steam or hot-water lines, may be used to radiate heat and supply the necessary moisture.

For years, Frigidaire and General Motors engineers have been working on this small, compact air-conditioning unit. It is a proven, practical success.

Mail the coupon for literature and complete information today; let us tell you what this new Frigidaire Air Conditioning Unit can do for you in home or office; in restaurants, shops, stores, banks and other business places.

Frigidaire Corporation,
Subsidiary of General Motors Corporation,
Dept. G-31, Dayton, Ohio.

Please send me illustrated literature describing the new Frigidaire Refrigerated Air System.

Name .....

Address .....

FRIGIDAIRE
REFRIGERATED AIR SYSTEM

• This is one of many advertisements used this year. It appeared in full color on the back cover of Collier's July 2nd •

AGAIN FRIGIDAIRE LEADS THE WAY ... with Air Conditioning Equipment

● One reason why Frigidaire dealers are assured a healthy volume of business and satisfactory profit margins is the wide line of Frigidaire products. The latest development—Air Conditioning Systems for homes, business offices and stores—is the most complete line available and still further increases the Frigidaire dealer's opportunity for profit. This line has already been backed by powerful advertising which capitalizes the public's natural interest in this new achievement. Inquiries from thousands of live prospects have been received this year.

1932 is no exception in money-making possibilities. Frigidaire dealers have reported many substantial increases in sales.

Investigate the Frigidaire Franchise and you'll want to go with the leader. Wire or write today for information. Use the coupon.

FRIGIDAIRE

The General Motors Value in the Refrigeration Industry

MAIL THIS COUPON FOR FRANCHISE FACTS

FRIGIDAIRE CORPORATION, Franchise Division, Dept. M-314, Dayton, Ohio.
Gentlemen: Please send me the facts about the Frigidaire Franchise.

Name .....

Business ..... *Address* .....

City ..... *State* .....

How To Sell Air-Conditioning Equipment

As Practiced By Various Sales Organizations In Refrigeration Field

Frigidaire Factory Branch

By Elston D. Herron

DETROIT—The salesman of air-conditioning equipment who knows his business talks "comfort" to his prospects, and says little about technical details.

This is the opinion of C. H. Lewis, supervisor of the air-conditioning department in the Detroit branch of Frigidaire Corp.

One other talking point is of first importance—the protection of room furnishings and the room itself, made possible by the equipment's dehumidification of the air it cools and circulates.

The average prospect knows little or nothing about what humidity is, how air should be circulated, or how much it needs to be cooled. But he does know that in the summer season, his home, his office, or his business establishment is too hot for comfort and good work. And he can understand that excess moisture in the air is harmful to walls, decorations, and furnishings.

It is because of these facts that the salesman who can guarantee his equipment to supply constant comfort under all conditions will usually be given an audience even by doubtful prospects.

How to Secure Prospects

Prospects are secured by Frigidaire salesmen in four ways: by canvassing; by getting names from users of air-conditioning systems; by selecting names from lists, compiled by the organization, of well-to-do home owners and business men; and through inquiries resulting from advertising.

When a good prospect has been located by a Frigidaire salesman, the latter immediately sends him a piece of literature describing the advantages of Frigidaire air-conditioning systems. Having had time to read the material and give it some consideration, the salesman makes his first call to discuss air conditioning with his prospect.

The salesman carries with him on this call an air-conditioning "album," and this he uses almost exclusively to outline the merits of the equipment.

Use Demonstration Album

The attractive, loose-leaf volume contains page after page of pictures illustrating the fact that summer heat hinders clear thinking, injures health, and reduces pleasure in countless ways.

It endeavors to show, with pictures and convincing captions, that comfort is not to be had consistently in the summer season without the use of air-conditioning equipment.

Completing the sales book are pages of color-photos of Frigidaire units in various settings—all emphasizing the units' attractive appearance and their adaptability to surroundings of any kind.

In addition to literature from the Detroit branch, the prospect also receives a series of three folders from the Dayton office—one each week—further presenting the benefits to be had from air conditioning. The last folder has as its purpose that of convincing the prospect to "act today," and has as its title, "Why Not Get the Facts Now?"

Personal Letters Follow

His first call completed, the salesman notifies his chief of its outcome, and there is sent from the office to the prospect a personal letter discussing air conditioning. Unless the prospect buys immediately, two other personal letters follow the first.

When the salesman makes call No. 2, he urges the prospect to go with him to the branch office, to the salesroom in the General Motors building, or to the Penobscot building, where Frigidaire air-conditioning systems are installed.

Mr. Lewis believes that a prospect's visit to one of these places is of paramount importance in making the sale, as it not only furnishes the salesman with an opportunity to make an actual demonstration, but enables the prospect to see for himself the equipment and its results.

Again the salesman points out the "comfort and protection" offered by the system, and demonstrates the operation of the units.

The training given an air-conditioning salesman is purposely only semi-technical in character.

Frigidaire executives believe that the salesman who knows too much about the engineering aspects of air conditioning—the same being true of refrigeration—is inclined to launch vigorously into a technical discussion of the equipment that will bewilder his prospect and make him afraid to install such an apparently elaborate mechanism in his home or place of business.

Salesmen are taught the basic principles of the systems and their capabilities, to give them a thorough knowledge of what they are selling—but installation problems and the like, no.

When the prospect is "sold" on the idea of air conditioning, the salesman takes his next step and proposes that a Frigidaire engineer be allowed to make a survey of the prospect's home or business establishment, and recommend the specific type of installation needed there.

This done, a letter containing a list of the units needed, their prospective location throughout the quarters, a resume of the advantages of air-conditioning, the organization's guarantee of satisfaction, and finally, the price, is prepared and sent to the prospect.

The salesman then makes his last call, reviews and explains further the content of the letter's proposal, and endeavors to close the deal. In Mr. Lewis' words, a sale of air-conditioning equipment is usually a "three- or four-contact transaction."

Ilg Co. Factory Branches

CHICAGO—No commission salesmen are employed by the Ilg Electric Ventilating Co. to sell its Ilg-Kold air-conditioning equipment and Ilg-Kold Ice Koolers. Ilg factory branches, which are the sole merchandising outlets for the equipment, employ only salaried representatives. At present, the company has no dealerships.

"Commission salesmen are inclined to drift from place to place," says Milton K. Arenberg, Chicago district sales manager, "and we believe that drifters do not represent a company properly."

Consequently, Ilg has established factory branches in 21 major cities of the United States, each branch having its own force of salaried representatives for sales work.

The company bases both its training of these representatives and its appeal to the buying public on one principle—"simplified engineering."

Book of Instructions

Each sales representative is supplied with an instruction book containing complete information on the theories of refrigeration, definitions and explanations of refrigeration terms, and detailed discussions of every part and feature of Ilg-Kold air-conditioning and air-cooling equipment.

It also furnishes instructions for estimating costs and sizes of installations, gives numerous diagrams of sytems, and the factors to be dealt with in making installations.

The book is written as simply and clearly as it has been possible for factory engineers to make it, and contains forms showing in what order to list equipment when ordering from the factory.

The Ilg company intends that its representatives shall get so clear a picture of Ilg air-conditioning equipment from the manual that they will be able to make their sales talks simple, yet concrete enough that the prospect, even though he has a poor comprehension of things technical, will have some understanding of what he is buying.

Ilg sales representatives have a complete technical knowledge of air-conditioning equipment, even before they study the instruction book, for they have sold other Ilg appliances and have been in touch with Ilg air conditioners and coolers as they were being developed, but they use the manuals to learn how to suit their sales presentations to the prospect.

These representatives not only sell air-conditioning equipment to prospects, but estimate the type and number of units to be installed, and decide upon their placement in establishments to be equipped with the systems.

Little attempt has been made, to date, to sell Ilg air-conditioning equipment for home installations. According to Mr. Arenberg, the company believes that, at present, the profitable field is that of business establishments, offices, etc.

Eventually, however, the organization will extend its endeavors into the field of household installations.

To Establish Dealerships

Mr. Arenberg says that in due time, dealerships for Ilg air-conditioning equipment will be established. Members of the factory branch sales forces will contact prospective dealers, and seek to secure them as dealers with much the same method as is now used in talking to prospects.

Mr. Arenberg believes that while the cost of air conditioning for the home is of secondary importance to the owner, because he is merely seeking comfort, the cost of equipment for retail business establishments is of prime importance, because proprietors usually demand that increased profit result from installations.

Unit cooling in retail stores is an approach to the goal of universal acceptance of air conditioning, he says, because many merchants who have installed air-conditioning systems are able to show that increased profits have resulted directly from the installations.

He believes that the industry has been too hasty in assuming that theaters and restaurants offer the greatest market for air-conditioning equipment, simply because these two groups have led in accepting proper standards of ventilation.

Drug stores, shoe stores, women's ready-to-wear apparel shops, millinery stores, men's clothing stores, grocery stores, and 5-, 10-, 25-cent, and $1 stores are also excellent prospects, he thinks, because no matter how attractive their displays, customers will not linger long in establishments where they are uncomfortable because of bad air.

Junior Leaguer Goes to Work

Miss Eleanor Hagerty, Junior League member and Frigidaire air-conditioning saleswoman in New Orleans, demonstrates a unit to a prospect.

Detroit Utility Promotes Sales

By Phil B. Redeker

DETROIT—The Detroit Edison Co. is now actively engaged in the promotion of air-conditioning equipment sales, offering free consultation to all of its customers who desire information relative to air conditioning, installing equipment in its branch salesrooms to educate the public to the advantages of comfort cooling, and promoting the idea to prospects through newspaper and direct-mail advertising.

This is the first year that air conditioning has been actively promoted, although the idea has been under consideration for some time, according to S. S. Sanford of the power sales division. The usual decrease in the power load during the summer months was one of the main factors in inducing the utility to launch its campaign, Sanford states.

One of the first moves made was to install air-conditioning equipment in some of the local offices. The ventilating system in the main downtown office on Farmer St. was converted to an air-conditioning system by the installation of an ice-cooling tank and coils. Water cooled in the tank is pumped through coils which have been placed in the ventilating ducts.

A similar installation has been made in the Port Huron, Mich., office and another one of the same type is being planned for the Birmingham, Mich., office now under construction.

The offices of the Detroit Edison Co. in the General Motors building are cooled by eight Frigidaire cabinet-type coolers with three 3-hp. compressors furnishing the necessary refrigeration.

At Ann Arbor, Mich., the utility's offices are being cooled by a ventilating system which furnishes cooled air by a series of coils carrying cold water. The water is cooled by a 13-ton Wittenmeier refrigerating machine.

In addition to these installations, two engineers of the Detroit Edison Co. have placed equipment in their homes to make observations on efficiency and operating costs. One of these is in conjunction with a warm-air heating system in which water cooled by a sunken ice tank is combined with city water to furnish the cooling effect. The other installation is of a Chillaire portable room cooler, using ice.

Observations to Aid Sales

Observations on these installations are expected to aid the air-conditioning department in offering advice to prospects interested in the subject.

The direct-mail part of the promotional campaign has consisted of a 3-piece mailing, the first of which was sent out in March. A selected list of professional men, food-serving establishments and others likely to be interested in the application of air-conditioning equipment received these mailings.

The circulars called attention to the possibilities of increased profits through air conditioning, and the fact that it is now available for small offices or food-serving establishments. The circulars also called attention to the fact that the Detroit Edison Co. was prepared to act in an advisory capacity on the subject of air conditioning.

"Reply cards" enabling persons receiving these circulars to indicate their interest in the subject has resulted in approximately 200 inquiries, according to Mr. Sanford.

Showroom Demonstration

July was selected as the time for a newspaper advertising campaign promoting the idea, and newspaper copy calling attention to the advantages of air conditioning and the free consultation facilities offered by the Detroit Edison Co. has resulted in many requests for information, Sanford states.

Similar advertising copy has appeared in the *Detroit Athletic Club News*, this periodical being selected for the reason that it reaches a high-income group, the class which represents the best potential market for air-conditioning equipment at the present time, Sanford points out.

The utility has had the cooperation of practically all companies engaged in the manufacture of air-conditioning equipment in offering information on the subject of comfort cooling, according to Sanford. A "library" of data sheets and list prices has been compiled to aid the consultants in answering questions relative to the size and cost of equipment in which a prospect indicates interest.

Cooling equipment of both the ice and mechanical refrigeration types is being discussed and advocated, Sanford states, as an increase in the consumption of ice represents an increased power load for the utility due to the amount of electricity used by ice-making machinery.

Copeland Factory Branch

By Elston D. Herron

CHICAGO—One thing above all others is stressed in the training of salesmen who are to sell Copeland room coolers and Airtrol air-conditioning equipment for the Copeland Refrigeration Co. of Chicago: that they must sell units of sufficient capacity to give satisfaction under the most adverse conditions.

It is better not to make a sale than to install one system in a home, office, or store where several are needed, is the belief of H. T. Kessler, president. The customer will not be satisfied, he will not hesitate to say so, and an ultimate loss of business will result.

The Chicago Copeland factory branch accepted the agency for Airtrol equipment several weeks ago, and will sell it jointly with Copeland room coolers.

The latter will be sold wherever possible, but salesmen are instructed to sell Airtrol units where large installations are needed, or where washing and recirculating are desired.

Salesmen receive semi-technical training. Before starting to sell room coolers and air conditioners, they are obliged to read and study all available literature on the subject of air cooling and conditioning. This literature, says Mr. Kessler, is secured from libraries, magazines, books and factory bulletins.

The salesmen are then taken to visit business establishments and homes already equipped with various makes of air-conditioning units, for the purpose of learning what installation problems are, and how they have been dealt with by other organizations.

With this general study course and series of visits completed, the salesmen are given training in the principles and operation of Copeland and Airtrol equipment, and are then sent out to begin actual sales operations.

The branch has prepared lists of prospects of various classifications—restaurants, food shops, brokers' offices, funeral parlors, banks, etc.

From these lists the salesmen get their leads and start their work. After their first call on a prospect, the latter is sent a series of letters and telegrams, followed by other calls from the salesman.

The prospect is finally brought to the Copeland showroom, where air-conditioning equipment is installed, so that he may see the system in actual operation.

This visit completed, the salesman estimates the exact size and number of units needed in the prospect's home or place of business, and submits his specifications with a layout of the place to be equipped, to factory branch engineers.

These figures approved, the salesman is prepared to make his prospect a definite sales proposal, including the cost, number of units needed, and their location in the room or rooms to be cooled.

The salesman's talks to prospects are non-technical, the factory branch believing that discussions of engineering aspects of the equipment by the salesman would impede the progress of the sale rather than help it. Only when prospects ask for technical information is it given by salesmen.

Representative Studies Job

Copeland refrigeration dealers are urged to promote sales of air coolers and air-conditioning equipment, but a factory branch representative makes a survey of the prospect's establishment and makes specifications of the job as a service to the dealer.

All salesmen receive bulletins of sales aids and promotional folders regularly from the factory at Mt. Clemens, Mich.

Meetings of salesmen are held every morning, and a weekly meeting is held every Friday night.

If the buyer of air-conditioning equipment does not wish to pay for his system in full at the time of the sale, the branch finances the sale on the basis of a 20 per cent down payment, with the balance to be paid over a period of 24 months.

The branch maintains a staff of three representatives who specialize on sales of Copeland room coolers and Airtrol air-conditioning equipment.

Michigan Carrier Distributor

DETROIT—The Radio Distributing Co., Michigan Mayflower electric refrigerator distributor, has taken over distribution of Carrier portable room coolers.

At present, the organization is selling only ice coolers, but other Carrier equipment may be merchandised through the company later this year, according to G. N. Tobias, general manager of the Radio Distributing Co.

Carrier room coolers are the first equipment manufactured by that company to be merchandised by agencies outside of the Carrier organization.

Handling of the room coolers is optional with the Mayflower distributor's dealers. If a dealer chooses to sell Carrier room coolers jointly with Mayflower refrigeration, he is given selling aid in one of two ways by the distributor:

Either he can appoint one individual to specialize in room-cooler sales in his territory, and have that salesman trained in the construction and selling points of the cooler at the distributor's headquarters, or he can locate prospects, and then solicit the aid of a member of the distributor's technical staff in making the sale.

When a sufficient number of room-cooler salesmen have been appointed by Michigan Mayflower dealers, these salesmen are brought to Detroit for an evening's training session with members of the distributor's technical staff or representatives of the Carrier Corp.

If dealers do not wish to take on a stock of the coolers, they are privileged to bring prospects to the Radio Distributing Co.'s showroom in Detroit, where a unit is in operation, to make sales demonstrations.

EFFICIENCY IMPROVED BY AIR CONDITIONING

WASHINGTON, D. C.—Air-conditioning equipment installed in a factory for the purposes of experimentation resulted in higher efficiency among the workers, improvement in health, decreased absence from employment, and a reduction in labor turnover, the Women's Bureau of the Department of Labor points out in a recent "News Letter."

Results of the experiment, which was carried out in the American Cigar Co. plant, Philadelphia, by the Philadelphia Electric Co., in 1930, are just now announced.

The air-conditioning equipment was required for 85 days of the summer. Without it, the company had found that in the cigar-making department, an average of 50 girls per day for 75 days would be sick or tired and would leave work at noon.

With the air-conditioning equipment, lost time was reduced to an average of only five girls out a half day for 75 days.

The improved conditions were found to increase efficiency so that the proportion of cigars rejected because imperfect was reduced from about 3 per cent to about 1 per cent. This increased both the plant's profits and the girls' earnings.

There was also a reduction in labor turnover by about 100 girls, as "not so many felt the urge to take jobs as waitresses in summer resorts."

The air-conditioning equipment, it was found, paid for itself within two summers.

"It should be remembered," said H. H. Mather of the Philadelphia Electric Co., who made the study, "that the figures are for the cigar-making department alone."

If similar studies were made in the stripping and packing departments, it was believed that additional savings would swell the total.

"No attempt was made to evaluate the general increase in health that has resulted from the comfortable working conditions provided," it was said. "Production executives in many industries will do well to weigh this last point. Added to the tangible benefits of refrigeration it is a powerful argument in favor of a comfortable plant."

HOLLAND UNIT USES SPECIAL THERMOSTAT

By V. W. Cherven, Chief Engineer, Holland Furnace Co.

THE HOLLAND air-conditioning machine controls the temperature of the air within a home by the means of a specially designed room thermostat which is connected in series with the several controls for the fans, with the magnetic water valves, the draft controls, etc.

As a second function, it humidifies or moistens the air by causing the return air supply ducts to discharge the air into a water-spray chamber which adds the required water vapor to offset the vapor loss due to expansion of the air when passing through the air-heating or plenum chamber.

Thirdly, it cleanses by passing the air through closely woven copper mesh filtering screen, and by forcing the air through a mist of water spray. The machine is equipped with double-width, multi-vane fans to create a positive air flow through leader pipes or ducts.

In addition to those points enumerated above, the machine is also used during the hot summer months and creates a cooling effect of several degrees where available tap water temperatures do not exceed 60° F.

During the hot summer months there are localities where the city tap water temperatures are too high to bring about sufficient air-temperature reduction and dehumidification of the air. For such localities a compressor with water-circulating pump is now available.

The conditioner proper consists of a water spray chamber equipped with at least five spray heads. For the larger installations additional spray chambers and spray heads are furnished. It is also equipped with eliminator or scrubber plates through which the air passes into the air-distributing chamber, the latter being a part of the completed unit; two centrifugal fans delivering from 1,000 to 2,500 cu. ft. per minute; closely woven mesh copper filtering screen; a comfort control for the fans and the electric magnetic water valves.

In addition, it also includes a draft motor controlling the combustion of the fuels and actuated by a specially designed room thermostat which is installed on the main living room floor and where it is exposed to the average air temperatures of the home.

There is also a temperature limit control which in a warm-air heating plant installation is located in the plenum chamber. An aquastat switch or vapor switch are furnished on the main riser above the boiler on steam, hot-water or vapor-steam heating plant installations.

Air Conditioning Has Two Uses In Ice Cream Plants

AIR conditioning has a special two-fold application in ice cream plants—first, that of reducing atmospheric temperature; and second, that of removing excess moisture from the air and floors.

"All ice cream plants have an excess of moisture on the floors and in the room air due to steam and hot water used in cleaning," stated H. W. Brigham, president of Teall's Ice Cream Co. of Rochester, N. Y., in discussing the subject before the sales managers and production councils of the International Association of Ice Cream Manufacturers during the last meeting of that group.

Proper Use of Units

Air-conditioning equipment is properly used in freezer rooms, mixing rooms, and hardening room corridors in ice cream plants, Mr. Brigham pointed out.

"The effect upon the product cannot be measured accurately in terms of texture or flavor, but its principal effect may be observed in the cleanliness which surrounds the most important process in our plants," Mr. Brigham observed. "We all know that our freezers incorporate the room air into the product where any moisture which this air carries is condensed in the form of ice particles. Thus, it stands to reason that a cleaner, dryer air is more adequate protection for the product.

"More important than this is the knowledge of superior cleanliness in the handling of the pint and quart packages, the cans, the moulds and other tools which are necessarily handled by the ungloved hand of the employe.

Perspiration a Problem

"The subject is too delicate to discuss with the customers or the public, but we know that the heat in our factories, intensified by the necessity for hurry, causes a certain amount of perspiration from a human hand and head to contaminate all of these above mentioned tools of the trade to some degree, even falling into open receptacles during the process of filling cans or packages.

"Long ago we started supplying clean, white uniforms, fresh every day to our employes, and now with the air conditioner we find that clean, cool, circulating air carries evaporating excess body moisture to the condensing chamber of the air conditioner where it stays frozen until the machine is shut off and the melted frost runs down the waste drain.

"Surely, this further step towards positive cleanliness is helpful for such a delicate product as ours. Already the baker, the theatre manager, the office builder, and many other industries find that air conditioning is helpful—yes, even necessary to their business success."

Health Effect

The effect on employes' health, happiness and daily productivity, all of which have a direct bearing on the profit sheet, real and measurable in dollars and cents, is the most important benefit of air conditioning, Mr. Brigham declared.

"No man or woman works under normal efficiency during the hot, humid days of summer. The spirits of people are tired and depressed and they are wilted and faded physically by the strain of this type of weather, but during the past summer, the improvement made by the air conditioner within our factory was remarkable.

"It accomplished all the things which I have told you in the past, plus the postponement of fatigue, and created a cheerful and helpful attitude in this department, which has been measured in benefits to them and in lowered cost to us. Frequently, during the past years the absence of employes due to sickness made us carry one extra person for each seven on the payroll, that our organization might not suffer. This year we had only one absentee one day among the employes in this department.

Efficiency Improved

"The savings to us in increased productivity cannot be measured in dollars, but the higher efficiency can be visioned when I relate that while our gallonage was only slightly higher this year, still the percentage of package business in total sales rose from 30 per cent in 1930 to 58 per cent in 1931, with practically the same number of employes working with no extra hours—to fill nearly twice as many gallons into packages took no more help.

"But the productivity of employes is not the most beneficial effect noticeable. The clean, sanitary conditions and the increased personal comfort surrounding the work of your employes promote friendly and helpful spirit of intelligent cooperation."

HOT-KOLD SYSTEMS MADE BY EDWARDS MFG. CO.

CINCINNATI—The Edwards Mfg. Co. here is producing the Hot-Kold central heating system which cleans, heats, humidifies, and circulates air throughout a house. Equipment for cooling the air by refrigeration may be secured with the Hot-Kold system. The Hot-Kold is a gas-burning system.

Servel Commercial Dealers Have These Advantages

• NEWEST DEVELOPMENTS
• WIDER RANGE OF MODELS

COUNT the refrigeration prospects on any of your city's streets. One . . . two . . . three . . . six . . . nine . . . twelve. How many of them fit within the limited range of average commercial refrigeration lines?

Every commercial refrigeration prospect is a prospect for the Servel Dealer . . . he matches every refrigeration need with a unit designed to fit the purpose.

Diffusing units? His Humidraft rates high. Room coolers? His Comfort Cooler is a leader. Extra capacity machines? He has heavy duty equipment for every need. Gasoline-driven units? He is a specialist. Naturally, with such a line, any dealer can make money in commercial refrigeration!

- *Servel Comfort Cooling for offices, stores, homes.*
- *Humidraft for market coolers.*
- *Servel Water Coolers.*
- *Servel Ton Plus Refrigerating Equipment.*
- *Servel Beverage Coolers.*
- *Servel Ice Cream Cabinets.*
- *Servel Ice Makers.*
- *Servel Milk Cooling Equipment.*

Don't deliberately cramp your prospect list to fit a limited line. Step in with a wide-awake, progressive factory connection and broaden your selling field . . . double your sales opportunities.

If you are alert, aggressive, Servel wants you. Write today for information regarding the status of the Servel Commercial Refrigeration Franchise for your city. Put yourself in line for a really profitable connection.

SERVEL SALES, INC., Evansville, Ind., Manufacturers of a complete line of household and commercial refrigeration.

SERVEL
Commercial
ELECTRIC REFRIGERATION

LITTLE STORIES OF INTERESTING PEOPLE IN THE REFRIGERATION INDUSTRY

THE EXPANSION VALVE

LITTLE STORIES OF INTERESTING IDEAS IN THE REFRIGERATION INDUSTRY

By George F. Taubeneck

Air Conditioning

The editors of this sheet are inclined to believe that the issue of ELECTRIC REFRIGERATION NEWS you are now reading contains the most complete, comprehensive, and up-to-date compilation of news and information on air conditioning in all its various aspects that has ever been assembled under one roof.

"On your left, ladeez an' gennemun, you will see . . ." But if we took you on a personally conducted tour through this highly interesting issue, it would take the whole page, and then some.

Every story is compact and condensed. Each paragraph contains information you can use if you are interested in air conditioning—and if you aren't, you should be. And with the exception of a few signed articles by industry authorities, all the stories in the paper were procured and written by staff members.

The different types of equipment are analyzed and discussed. So are the different types of applications, and the various selling methods now in use.

Worth putting leather covers on—that's how we think you'll feel about this issue.

* * *

Grand Piano No Omen

As indicated in the story beginning on page 1 of this issue, General Electric refrigerator distributors worked harder and played less at Camp Refrigeration VI in Cleveland last week than in any previous gathering of these men your correspondent has ever attended.

We were all quartered at Wade Park Manor, a somewhat swanky hostelry which has a park, an art museum, a whopping big church, and a residential district for neighbors.

When the Valve walked into his room there, the first thing he saw was a grand piano!

The room itself was large enough to house comfortably the entire editorial staff of the NEWS and had enough overstuffed davenports and chairs, along with an assortment of floor lamps, to start a home furnishings store.

"Um-hm," we thought. "They're off. The big spenders of the industry are in form. This party will probably be One of Solomon's Nights."

Wrong. All wrong. The "party" was more sober, solemn, serious, safe, sane, sound, and satisfactory than any other of its kind in our memory.

Distributors got up early, listened to speeches and discussed them on the floor all day, talked together quietly at night, and went to bed at reasonable hours.

There was little drama, no splurges, a minimum of excitement, scarcely any attempt to work up a lather of enthusiasm. Nothing but business, calmly considered.

* * *

Chins Up

General Electric refrigerator distributors aren't the type who send us—and expect us to print—blurbs like this:

"Mr. J. Turner Kerrigan, president and general manager of Wholesale Distributors, Inc., reports that public acceptance for the new 1½ cu. ft. model Jillopi is surpassing his fondest expectations, and that dealers all over his territory are rushing in with so many orders that the factory can't keep up with the demand. In the face of the business depression such optimism is considered worthy of favorable comment by Mr. Kerrigan.

"At a dealer meeting held last January a most enthusiastic reception was accorded the new line, all the dealers anticipating an unprecedented volume of business on this popular product. They have been getting more than their share of the business in this territory, and confidently expect to rout all competition in the next several months."

In other words, empty talk is just so much hooey to G. E. distributors. They are interested only in hard, cold facts. They aren't affected by the other fellows' gas attacks, and don't put out any themselves.

Hence, when G. E. distributors talked about the "spirit" and "optimism" and "enthusiasm" of a meeting—as they did about Camp Refrigeration VI—it meant something. It was the first time we had ever heard them use those words.

Reason: the plans they worked out gave them something to be enthusiastic about, and set them all to work with pad and pencil, juggling figures.

Between the spring meeting at Coral Gables, Fla., and this congress at Nela Park there was as much difference as there is between "Texas Babe" Didrickson and the w.k. Old Lady from Dubuque.

When the G. E. distributors gathered in Florida last February, they were trying to forget a trying winter when their fortunes had ebbed lower (comparatively speaking) than at any other period in their histories as Monitor Top salesmen. Moreover, they had few plans for the future.

At that time they were looking for bad times to come; and their guards were up. At Nela Park, given new products and plans and ideas, they were looking for good times to come; and their chins were up.

* * *

Ted Quinn, Orator

Some impatient people jump to the last chapter of a book "to see how it finishes" before proceeding through the body of a story. That's just what we're going to do here.

Ted Quinn's speech put the cover on Camp Refrigeration VI. It closed the book. In fact, it was the book. He packaged the three days of sessioning, tied the package with a neat ribbon, put a label on it, and showed the distributors how to sell it. And because that speech was so important, we're going to talk about it right here and now.

Trying to recapture and imprison in cold type the eloquence and sincerity of General Electric's youngest vice president is like trying to paint a sunset with a lead pencil. One's tools are so miserably inadequate.

Saying that he "speaks from the heart" is a cliche. But it's true. He is a fighting Irishman with a heart which (like that of the famous Minnie) is "big as a whale."

So honest are his convictions, so true the ring in his voice, so clean and intense the blaze in his eyes, that hearers are inclined to accept his straightforward statements practically without examination.

His oratory is not forced or studied. It's the stark sincerity of his manner which grips his audience. Under the circumstances, a reporter might be pardoned for failing to reproduce his exact words, and for utter inability to recreate the setting, mood, and temper of the remarks. Roughly, some of the things Mr. Quinn said ran something like this (quotation marks purposely omitted):

Our chief interest is the perpetuation, on a profitable basis, of this group. You distributors comprise the only hope the General Electric Co. has of reaching the ultimate consumer. Hence it is to our advantage to help you stay in business and make money.

In their early stages all appliances are sold by specialty organizations. Afterward, department stores and other "demand outlets" may take up the burden. But we are not concerned with them. How to move "demand goods" is their problem. It is our function to sell the idea. We have done it with electric refrigerators; and we can do it with other things.

"Tomorrow and tomorrow" there will be new devices, and more new devices, which a specialty organization can sell. It will be your job, and that of others like you, to introduce them.

We can't expect to meet price competition. We are in business to stay. Others may come and go—the kind who don't know how to make a living, and who never really expect to learn.

Today the job of convincing others that there *is* a great future ahead is an easy one. Victory is in the air.

Sometimes we have grave doubts about the American competitive system. Competition is the life of trade, but competition is war, and war is hell. Competition can drive an industry down to unprofitable levels.

The main reason why refrigeration won't go the way of the radio is that quality in an electric refrigerator is three or four more times as important as it is in a radio. We should all believe it profitable to maintain quality even at the cost of a temporary loss of business.

Go back and tell your salesmen that price is their big enemy. When prices become low, you don't need salesmen. Just advertise the low price, tell buyers where your merchandise can be had, and let 'em come in and get it. It takes higher prices to justify salesmen's commissions.

We can meet price with terms. We can afford to give long terms because we expect our machine to give long service. That can't be done with a cheap machine—its vendors must get cash and get it quickly. Those who burn their fingers on cheapness today will be apple pie for us in coming years, when replacement business should be good.

The big difficulty of all business today is the coupling of declining sales with fixed costs. If all things would flow down or up together, adjustment problems would not be nearly so acute. Capital investments, development charges, factory costs and equipment depreciation are, in a large measure fixed; and a manufacturer is stuck with them.

Here are some encouraging notes: U. S. bank savings today total 29 billions of dollars—$1,000 for every family in the country. The number of stockholders of listed corporations has increased 40 per cent since 1929. In spite of bank failures, there is now an equivalent of two savings accounts for every family in the nation.

We needn't worry about the country. All we need do is worry about ourselves and how we are going to solve our own particular dilemmas.

When anecdotes with which masterly speakers regale audiences are retold in print, they often fall flat. Hence we won't attempt to repeat Quinn's story about Rosa Ponselle, grand opera diva, and how she wept real tears during her own rendition of "Carry Me Back to Old Virginny."

The point of the tale, of course, is clear. One of the reasons Rosa Ponselle is a world-famous singer is that she can arouse such genuine and fulsome emotion in herself—and project it to listeners—when she does her stuff; that throws herself completely into everything she does.

We can, however, reprint a statement on "the crisis," written by Walter Lippmann, which the vibrant G. E. vice president read. The latter thinks Lippmann is America's "ablest and most scholarly writer on political and economic subjects," and so do we. Listen to him:

* * *

Walter Lippmann Says:

"In the past 10 years there has appeared a large literature prophecying the end of our civilization. Sometimes there is an accent of hope in the promise of a wholly new and infinitely better order of human life, and at other times there is a dull foreboding of decadence and deterioration. Thus there are those to whom Russia has become what America was in the Nineteenth Century; the land of the future where the ancient pains of the world are to be cured. And there are also those who have no hope.

"They are agreed, however, on the thesis that the chief characteristic of our time is the breakdown of established things. An overwhelming array of facts can be adduced in support. The Great War ended in the collapse of the European empires and of those remnants of the feudal system which have survived the revolutions since 1789. Since the War there has been a breakdown of a very large part of the financial obligations and of the economic organization to which men have been accustomed. There has been a vast disillusionment not only with the existing order but with its idealism over liberty, democracy, nationalism, and progress. One could go on endlessly, for here is endless material, pointing out the variety and the extent to which there have broken down, or been overthrown, or rejected, the things which the pre-war generation held to be most precious or most certain.

"Yet I suspect that when enough time has passed to bring this present into perspective, the historians will see a renewal of energy where we see a breakdown of achievements, and that they will see continuity where we see abrupt change.

"For what is the chief human fact behind all this liquidation of old arrangements, of old prestige, of old reputations and of old interests? Is it not the clearing away of rigid accumulations and of the hardened consequences of misjudgments that would, if they endured, block and constrict the enterprise of the generation which is now on the threshold of life? This is a hard time for those who are irrevocably committed to these establishments. It is a cruel and bitter time for those who are the present victims of disorder. But for the young and for those who are free in spirit it is a time of liberation and of opportunity. For them there remains, come what may, their own energy, and the richness of the earth, the heritage of invention and skill and the corpus of human wisdom. They need no more. Their paths will be more open, and what in one light is a vast breakdown of hopes is in another light the clearing away of debts and rigidities and preemptions that would choke them on their way.

"In this large sense depression and crisis are not the collapse of our system, but a furious purge. Conceivably a system can be devised which would be stable without accumulating an unsupportable burden of vested interests. But until such a system comes into being there is in every society as we know it a fatal tendency to accumulate too many obligations, to let arrangements become rigid, to let those who have retired from active life acquire too large claims, to let the grip of the place holders become too strong, to let seniority and privilege block the advance of youth and enterprise. So there must come inevitably a time of liquidation.

"The changes which ensue bring new faces and new formulae and sometimes new symbols, and there is for a while a great liberation of energies. But the new men in their turn begin to accumulate and to become set, and so the enduring changes are far smaller than the apparent ones. The new men are less free than they thought, and they must compromise their wishes with the inexorable necessities of man's existence on this planet and his ancient constitution. So the permanent forms of human life and of national existence change far less than it would seem that they must change when everything seems to be moving; for while nothing human is eternal, it is also true that nothing in the deeper patterns of human relations is easily altered.

"Thus no one springtime lasts very long, and no winter; and though nothing endures, the sap rises again to renew mortality."

* * *

Phil Harrison's Sissies

One of the interesting features of all General Electric distributors' conventions is that of the committees of these distributors and their reports.

Between-gatherings of the committee-of-the-whole, various small groups of distributors are considering common problems pigeon-holed and card-indexed under such headings as products, dealers, finance, appliance merchandising, conventions, and the like.

Chairmen of these committees present pointed and sometimes lengthy reports. Such reports waste no time on generalities or hokum. They state facts and opinions bluntly.

"Jesse" James, earnest and candid St. Louis distributor, presented the report of the product committee—which told exactly what his committee liked and wanted.

Turner Barger, cultured and incisive partner in the firm of Bard & Barger, distributor in Columbus and Cincinnati, who represented the committee on the merchandising of other appliances, read a pertinent set of observations and suggestions. Other reports were similarly factual and realistic.

Phil Harrison, hard-driving, courageous young distributor in Newark, utterly "wowed" the assemblage with his presentation of the report of the committee on conventions.

There were seven members on this committee, Phightin' Phil reported, and six opinions as to where the next convention should be held—Newark and New York City members agreeing.

The energetic young man from Newark, however, declared he would be glad to spend next January and February visiting all the nation's popular resorts and watering places in order to make an intelligent decision. So would some of the rest of us.

Unanimous on one point was the committee, averred Phil. The next convention should be held in March.

Manager Zimmerman then called for a show of hands on the question: "Shall the next convention be held in March?" No hands appeared.

Phil's "come on, you sissies," elicited no response. His "unanimous" committee had apparently evaporated.

* * *

Laundry Business

A particularly interesting feature of this convention was the announcement that many General Electric distributors will soon begin the sale of laundry equipment in conjunction with refrigerators, ranges, and dishwashers, in metropolitan areas.

This recalls the fact that the American Ice Co., whose subsidiaries' ice and fuel routes cover five Atlantic seaboard cities, has announced its entry into the laundry business.

The first unit of the proposed chain is to be the Knickerbocker Laundry Co., which will be operated by the Knickerbocker Ice Co., local subsidiary.

The plan which will probably be adopted for the hookup will provide for the ice man's functioning as the laundry's agent in his territory, delivering ice and picking up or returning the wash on one trip.

Working on this basis, the ice man will solicit laundry business from electric refrigerator owners in his spare time, in addition to seeking laundry business from his regular ice customers.

Thus it appears that electric refrigeration distributors who plan to sell home laundry equipment will again be brought into competition with the ice man.

After showing home owners how to refrigerate their foods conveniently in their own homes without outside help, distributors are going to show them how to do their own laundry work just as easily and independently.

* * *

Sinjun an' the R-r-rooshian

After having bunked in a cabin at Association Island last summer with a number of men from Maxon, Inc., advertising agency which has the G. E. refrigerator and range accounts, we had that old-friends feeling when we bumped into some of them again at Nela Park.

Sid Egan, goodfellow sophisticate whose conversation indicates he has been reading Defoe and Balzac, with Montaigne for dessert, was on deck, as were virile Ray Baker and serious Herb Selby—who improved each shining hour by asking questions. Like most advertising men, Herb has a questionnaire at the tip of his tongue, ready for use at any moment.

Fred Bollmeyer and George Straight, publicity men, were as harried and overworked as they usually are at conventions. The more we see of the duties and burdens of publicity men, the better we appreciate our own job.

One Maxon man we hadn't met was St. John (pronounced "Sinjun") Brenon, who has been writing copy for R. Cooper, Jr., and whose Holland furnace air-conditioning ads have been provoking such a stir.

"Sinjun," if you ask us, is a genuine addition to the Maxon camp. He has a story about a Russian refugee—in dialect and with gestures—which alone is worth the price of admission.

Lou Maxon, himself, the big, blonde, lusty, young Dutch buccaneer whose skyrocketing to a commanding position in the advertising firmament has been so startling, was there. And what a job of fraternizing he did!

With an appearance and a physical vigor suggesting a combination of Viking, professional football player, and Olympic pentathlon champ, Lou surprisingly combines an erudition and an appreciation of artistry which betokens the scholar and epicure. In more than a decade of reporting, we've never seen his like.

Walter Daily and the Valve took the seaplane from Cleveland to Detroit Friday evening, and were met at the dock by Mr. Maxon, who taxied us into town in a brand new La Salle (General Motors men please note).

As we roared over the lake which bulges between Detroit and Cleveland, Walter was rapidly scanning through a fistful of papers which he had taken from his portfolio. He looked at one memorandum, smiled, and pencilled this note to me: "Hawaii 117% of quota; Rex Cole 109%."

* * *

Just Friends

Here we are at the end of the kolyum and we haven't mentioned Ed Schaefer's wild ride with Col. Wasson, and how Ed's Milwaukee police badge was all that saved them both from the hoosegow, or "Hap" Pendergraph's unfailing good humor, or some of Kelly Courtwright's new ideas, or Turner Barger's new Ford, or how Rex Cole's young Mr. Hichborn and Dick Cooper's young Mr. Gifford had their heads together all through the camp, or what J. E. Neilly had to say about correspondence courses for salesmen, or Warde Stringham's vigorous refereeing, or how Syd Caswell promoted the use of the Detroit-made aerocar, or our pleasant Packard ride with "Bo" Bogart and family, and "Bo's" story about John Willys and the Poles of Toledo, or Kenneth Connolly's discovery of the reason why the Valve is an editor.

We haven't had a chance to comment on the stirring peptalk vented by Judson C. Burns, or that he is now completely in the General Electric fold, having supplanted the "Burns-Easy" washer—which he had made famous in Philadelphia—with G. E. laundry equipment.

Nor have we related some of our choice stories about "Cap" Griswold, Mark Wright, C. L. McCrea, L. W. Driscoll, Major Glueck, "Squire" Head, George Belsey, and "Ham" Campbell.

We haven't told about our long talk with Joe Donovan on the air-conditioning hodge-podge—and how it geed with another long talk we had a few days ago with J. C. Chambers, Frigidaire air-conditioning chief—or about some of Mike Mahony's new schemes, or the sheer pleasure one gets from just shaking hands with Harry Mealey.

But p'raps we've talked enough.

Problems of Selling Air-Conditioning Equipment Discussed By Schuyler

By G. L. Schuyler, President, Conditioned Air Corp., Detroit

AT the present time many organizations are confronted with the problem of increasing profits. The markets for their products have become more or less saturated and, as a result, they are eagerly seeking a new product which can be sold by their sales organizations and installed by their field men. As a result of this condition, a great deal of interest has been aroused in air conditioning. This new field offers tremendous possibilities in all respects and, in many cases, will fit into an organization set-up with very little additional cost.

The writer has in mind an organization which recently went into the refrigeration field. It was not particularly well equipped to enter the field, but by properly organizing the sales department, accomplished good results. The organization's experience in the refrigeration field has made it possible for it tc enter the air-conditioning field with very little change in the sales and installation set-up. This has resulted in the development of a profitable business with practically no increase in overhead.

Survey Field, Problems

Unless a distributor carefully surveys the field and its problems, he is likely to incur a great deal of ill-will by making a contact for a certain type of air-conditioning equipment, then distributing it without proper knowledge of what the limitations of the equipment are and the fundamental principles involved.

To date it has been more of a problem in the air-conditioning field to analyze the situation carefully, and assign distribution to the proper outlets. There is a rapidly expanding demand for air-conditioning equipment from firms all over the United States and many foreign countries.

In many cases, they are unfamiliar with the problems involved and, unless the manufacturer thoroughly analyzes each outlet, he will find his product obtaining a bad reputation through improper salesmanship, misrepresentation, and inexperienced installation work.

Best Method Unknown

What is the best method of merchandising air-conditioning equipment? This question is constantly being asked, but to date no satisfactory answer has been received. The difficulty in answering the question is partly due to the various types of equipment available for certain phases of air conditioning.

Air conditioning proper consists of humidifying, washing, filtering, cooling, heating and dehumidifying air. Equipment is available which will perform all of these operations at different times of the year when they are needed. Certain units are devised for cooling only, others for humidifying only and, still others, for washing and filtering the air. To a large extent merchandising of these products must be determined by the knowledge of the particular field which the equipment covers, and also, to some extent, by the character and personnel of the distributing organization.

Plumbing, Heating Field

Humidifying units which depend on steam or hot water connections are best marketed through the plumbing and heating trade or other organizations familiar with heating problems who have facilities for connecting heating equipment.

The small room cooler can best be marketed through an organization having a knowledge of refrigeration and the facilities for connecting compressors and wiring of such equipment. The more simplified type of room cooler offers a very wide market, as the problems involved are not particularly complicated and the installation is comparatively simple.

The small ice cooler of a cabinet type offers no installation problem as its motor can be connected into a light socket. Care should be exercised, however, to see that the unit will take care of the area properly.

Larger Systems

On the more expensive air-conditioning equipment, designed primarily for restaurants, shops, smaller stores and residential work, more care must be exercised in obtaining dealer outlets. Every new industry has developed its own type of dealer. The radio has developed dealers familiar with technical phases of the business who were not present before the radio was introduced. As the radio advanced and became simplified, dealer connections were greatly expanded. The same is true, to a certain extent, of refrigeration.

Doubtless, the marketing of air-conditioning equipment will follow much the same trend. There is a great field available for distribution of this equipment for capable engineers familiar with cooling and ventilating, to organize a distributing group, where their engineering knowledge can be tied up with the sales outlet and make an ideal set-up for the distribution of air-conditioning equipment. The industry is developing so rapidly that many manufacturers feel they cannot wait for a made-to-order distributor.

This type of equipment (for larger installations) consists of a cabinet which humidifies, washes and filters the air during the winter time. In summer it cools, dehumidifies and cleans the air. Its installation involves duct work; in many cases, heating connections; and, in all cases, refrigeration connections. The most important factor in the distribution of this equipment is to obtain a firm thoroughly familiar with the refrigeration and the necessary electrical wiring. It is also very advisable for such a distributor to contact closely a manufacturer, until such time as his men are trained to a point where they are familiar with the proper laying out of duct systems, etc.

Installation Costs High

In many cases, the installation cost is expensive. This is one reason why it cannot be handled successfully through an organization distributing a low-priced product. A firm distributing radios and refrigerators or other products, which specializes in the small-priced field of $100 and under, does not, as a rule, have a personnel adaptable to selling equipment running into several thousand dollars.

It is quite true that an organization of this type can open up another department, specializing in this type of equipment and utilizing the same engineering and installation group which are used for radio and refrigeration.

So far, the best results in merchandising have been obtained by direct sales effort, with a certain amount of advertising through channels which will reach the particular type of prospect being sold.

Sell an Idea

One of the most important factors in selling air conditioning is not to sell equipment, but to sell an idea. A man is not purchasing a piece of machinery or cabinet or cooling coils. In the first place, the average layman is entirely unacquainted with the results obtained from air-conditioning equipment.

However, he is aware of the necessity of protecting his health, his comfort, his home and its furnishings. This is what should be sold. A man may not be interested in buying a cabinet but he certainly is interested in preserving his health and working efficiency. No one can work properly in a 95 to 100° temperature during summer. Neither can he work properly in the dry, arid condition prevailing indoors during the winter months.

Air conditioning offers an exceptional opportunity for increasing business. A restaurant recently went out of business, due to the fact that it was not properly patronized. The atmosphere, in this particular restaurant, was smoky, stuffy and extremely hot in the summer time. A new restaurant opened in exactly the same location, but installed cooling equipment. Prices and quality of food are about the same but the new restaurant has a waiting list during the lunch hour and is doing good business.

KLENZAIR UNIT COOLS AIR BY WATER EVAPORATION

TOLEDO—Cooling by evaporation is the principle upon which the Klenzair unit, product of the Swartzbaugh Mfg. Co., operates. It functions chiefly to wash and circulate the air in a room.

Klenzair washes approximately 1,000 cu. ft. of air every ten minutes, according to its manufacturers.

Air is drawn in at the back of the unit, and is forced through four sprays of water within the machine, produced by the centrifugal force of four revolving metal discs which receive water from the bowl of the unit by means of two rubber rings.

A guard on the face of the appliance prevents spray from escaping the Klenzair. The water in the bowl must be changed occasionally, when the existing supply becomes laden with foreign matter.

The motor which drives the fan is a 110-volt, 60-cycle unit which may be operated on either a. c. or d. c. current. Connection with any standard electrical outlet is the only operation necessary to install Klenzair.

The standard Klenzair unit is 40 in. high, with a base 15½ in. in diameter. It weighs 22 lbs. Its body is of rust-resisting steel, while the finish of the upper structure is porcelain enamel, grained to resemble walnut. The lower structure is of walnut-colored lacquer.

Executive Discusses Cost Advantages Of Machine

CHICAGO—Basing his calculations upon estimated average costs of electricity, water, and ice in various localities throughout the United States, W. D. Jordan, president of Air Control Systems, Inc., estimates that the cost of a season's operation of a 1-ton Zephyr air-conditioning system, manufactured by his company, is $119.40 less than the cost of operating an ice unit of the same capacity.

Mr. Jordan's figures indicate that an air-conditioning system will be needed for cooling purposes approximately 600 hrs. in one season.

Assuming that a 1-ton mechanical unit will be driven by a 1½-hp. motor, using 1½ kw. per hr., this motor would consume 900 kwh. during the 600-hr. season.

And estimating that a ¼-hp. motor would be employed to operate the pump used in forcing cold water through the cooling unit, the motor would use .25 kw. per hr., and would consume 150 kwh. during the course of the season.

The total power consumed, therefore, during the season would be 1,050 kwh. Multiplying this total by four (considering that the average cost of electricity is four cents per kwh.), the total cost for power during the season would be $42.

Mr. Jordan estimates that the 1-ton Zephyr unit would use 75 gals. of water per hr., or 45,000 gals. during the 600 hrs. of operation.

Figuring the average cost of water at eight cents per 1,000 gals., the total cost for water during the season would be $3.60.

Adding the estimated costs of water and electricity together, Mr. Jordan's calculations show that the approximate total operating cost of a 1-ton system for one season would be $45.60.

His figures for operation of a 1-ton air-conditioning system using ice show that the cost of operating the pump motor would be the same as in the mechanical equipment—$6 for the 600-hr. season, assuming that a ¼-hp. motor would be employed, using .25 kw. per hr., and 150 kwh. during the season.

The ice system would use 83⅓ lbs. of ice per hr., he presumes. Multiplying this number by 600 (the number of hrs. in the season), Mr. Jordan concludes that 53,000 lbs. of ice would be used during the season when cooling is needed.

Estimating that the ice would cost 30 cents per 100 lbs., or $6 per ton, he estimates that the cost of the 53,000 tons of ice would be $159.

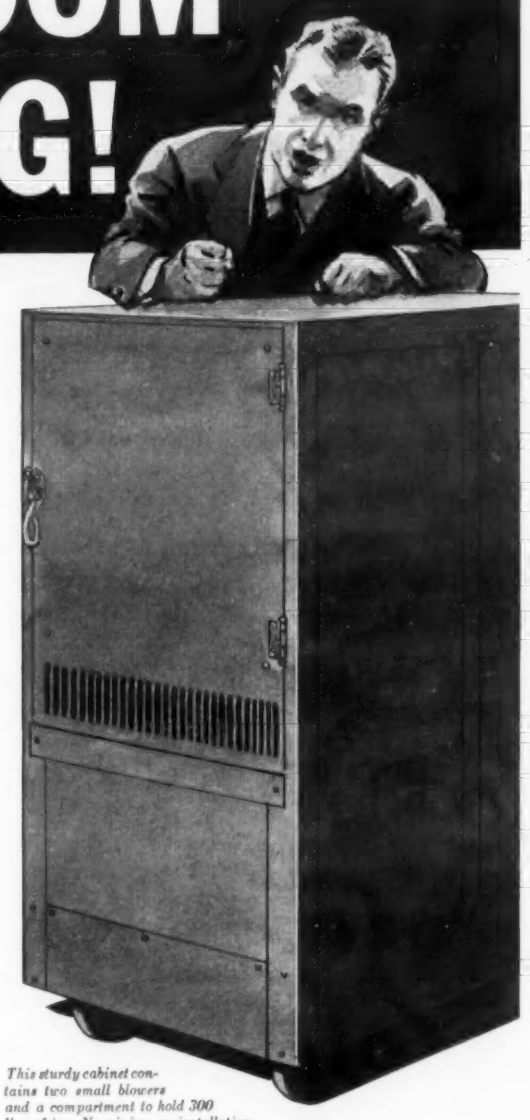
Adding to this the cost of operating the pump motor ($6), Mr. Jordan's final figures show that the cost of operating the ice unit for one season would be $165.

Get into ROOM COOLING!

—a brand-new business open to qualified distributors

Carrier PORTABLE ROOM COOLERS

offer a new untouched market for *profitable* sales



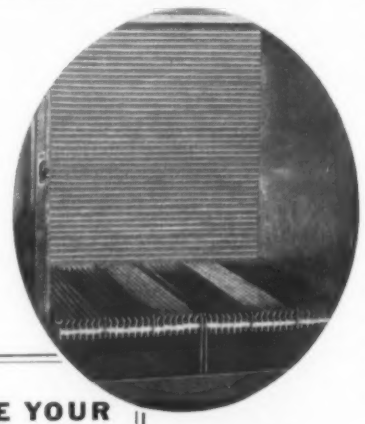
This sturdy cabinet contains two small blowers and a compartment to hold 300 lbs. of ice. No piping or installation expense.

RIGHT under your nose is a chance to cash in on a public demand that is founded deep in human nature . . . the desire to find a cool, comfortable spot in hot weather.

You've been to air-cooled movies. You appreciated the relief from sweltering heat. But you knew it took thousands of dollars of expensive machinery to give that relief. Now *you* can walk into any small place of business and offer the same comfort—*inexpensively*. You can say:

"I can give you effective summer cooling without investing money in costly machinery. Using ordinary, inexpensive ice, the Carrier Portable Room Cooler will give you and your customers *cooled, dehumidified air.*"

Think what that means to a storekeeper. No loss of summer patronage . . . clerks always at their best . . . customers pleased. In other businesses, too—beauty parlors, barber shops, hotels—you can sell *relief from hot-weather slumps.*



The ice rests on this metal grid, and melts down between the fins, forming an extended cooling surface. The air is drawn across this surface and distributed to the room through outlets in the top of the cabinet.

There's practically nothing in the Carrier Cooler to get out of order. The only moving parts are two small blowers which draw the air over specially constructed grids on which the ice rests. So foolproof are these coolers that you can *rent* them as well as *sell* them.

The Carrier Portable Room Cooler offers to a limited number of qualified distributors an opportunity to develop a brand-new business. Our merchandising plan includes national consumer advertising, liberal discounts, display coolers for 30-day demonstration, sales literature and mats for local newspaper advertising. If you are in a position to direct your merchandising ability into new channels, send the coupon to Carrier-York Corporation, 1541 Sansom Street, Philadelphia, Pa.

HERE ARE YOUR CUSTOMERS

BARBER SHOPS
BEAUTY PARLORS
MEETING ROOMS
HOTELS
OFFICES
STUDIOS
HOSPITALS
STORES & SHOPS
SICK ROOMS
CLUBS & LODGES
DOCTORS' OFFICES
DENTISTS' OFFICES
FUNERAL PARLORS
CANDY SHOPS

Carrier-York Corporation

A DIVISION OF CARRIER CORPORATION
Philadelphia, Pa.

MAIL TODAY FOR FULL INFORMATION

CARRIER-YORK CORPORATION, Philadelphia, Pa.

Gentlemen: We are interested in selling Carrier Portable Room Coolers. Please tell us about your distributor plan. This does not obligate us.

NAME .....

ADDRESS .....

Air-Conditioning Equipment In Restaurants and Hotels

Food and Candy Stores Find Summer Business Increased By Cooling

By Phil B. Redeker

DETROIT—Proprietors and managers of food-serving establishments in which air-conditioning equipment has been installed, ranging from a tea room in a leading Detroit hotel conditioned by a system employing 60 tons of refrigeration, to a small Chicago confectionery utilizing two unit-type room coolers, are unanimous in voicing approval of the benefits rendered by air conditioning, citing increased patronage, customer comfort, and greater efficiency in operation as the main advantages accruing from the installation of such equipment.

The Book-Cadillac hotel in Detroit early this summer installed equipment which would cool, dehumidify, wash, filter, and add ozone to 11,000 cu. ft. of air space in its Boulevard tea room and cafeteria four times every hour.

Patronage of these two rooms showed a 45 per cent increase during the first month of the operation of the system, as compared to the same month last year, when there was no air-conditioning equipment installed, according to E. T. Lawless, manager of the Book-Cadillac hotel.

"The installation of air-conditioning equipment has made it easy to 'sell' the hotel to conventions and other groups," Lawless states. "One of the first questions asked by such groups when they are making inquiry for space is whether or not they will eat in comfort.

"So important do we consider this feature that we are centering all our advertising about it during the summer months."

Small Candy Store Cooled

Last summer the hottest and smallest, as well as one of the busiest stores of the well-known DeMet's chain of candy stores in Chicago, located at the corner of State and Madison, was equipped with Copeland unit-type room-cooling equipment.

"The results obtained in this installation, made in the worst (as far as ventilation is concerned) of the stores in the chain of tea rooms we are operating in the Loop, was far beyond our expectations," states George DeMet, head of the chain which bears his name.

"In connection with this particular tea room we have a candy department for the retail sale of our confections," Mr. DeMet said. "Heretofore we have had considerable trouble in keeping chocolates in the showcases during the warm days, but since the installation of the room coolers our chocolates throughout the warmest days were just as fresh and solid as they were in our ice boxes at the commissary where they are stored immediately after they are made.

"We are convinced that room cooling for summer is a necessity just as much as a heating system is for winter."

York Unit Installation

Last summer the Netop Lunch Room in Providence, R. I., purchased a dry-type unit cooler manufactured by the York Ice Machinery Corp. The management reported an increase in business of 30 per cent during the months of July and August, when the business of practically all other restaurants fell off.

This increase made itself felt in two ways, the management says: first, customers were attracted who wanted to eat in a cool comfortable place; second, customers ate more than they would have ordinarily—refreshing dry air making them actually hungry.

The York conditioner is located on a balcony at the rear of the restaurant. Ducts run from this conditioner to the front of the restaurant with openings near the ceiling at the rear and at the front. The equipment is designed to maintain a 10° F. differential between outside and inside temperatures, and to reduce the relative humidity 50 per cent.

The air motion and the air circulation in the restaurant are so designed that a plus pressure is maintained in the dining room, thus forcing cooking odors out of the restaurant and preventing dust from entering the front door.

11 Frigidaire Coolers Used

Installation of 11 Frigidaire room coolers in the Seville Tavern, popular Dayton restaurant, led to a 30 per cent increase in business during the first two weeks the coolers were in operation, according to M. J. Comisar, president of the company operating the restaurant.

Advertising a temperature of at least 15° F. cooler than the outside temperature, the Seville Tavern has made its place of business known for comfortable eating. Customers, it has been observed, have been ordering many more hot plate lunches instead of the salads and sandwiches which usually constitute the hot-weather lunch.

Scarcely a single patron entering the restaurant for the first time fails to comment on the cooling system, Mr. Comisar says.

Experience as a confectioner convinced Proprietor H. L. Stimson of the new Mary Lee Candy Shop in Detroit that cool air is one of a confectionery's greatest attractions, and he accordingly equipped his shop with a Universal Cooler air-conditioning system.

No space was available for installation of the regular Universal Cooler conditioning system, so special units of the suspended type were employed. One unit is placed on either of the side walls, the casings of both being painted white to match the ceilings and walls. The system maintains a temperature of approximately 72° F. and lowers the relative humidity about 10 per cent.

Copeland Room Coolers

The Puritan cafe on Grand Boulevard in Detroit is unique in that it has "second generation" room cooling. Some of the original models of Copeland room-cooling equipment were installed in this food-serving establishment, and so pleased was the management with the results of the installation as reflected in increased patronage and comments of the patrons that the cafe was one of the first to install the improved model brought out by Copeland last year.

The installation consists of four Copeland unit coolers, two installed on each side wall. The refrigerating units are set up in the basement.

The Press Cafeteria, located in the basement of the National Press building in Washington, D. C., has no direct outlet to the street. A building ventilating system brought outside air into the cafeteria, but in summer, Washington's outside air is much too hot to be brought inside. Added to this, was the heat of the steam table and the natural body heat of the cafeteria patrons.

Last summer, Milton Hollander, manager of the cafeteria, decided to install a cooling system to combat the summer slump which most of his competitors took for granted.

He approached officials of the Fox Theater, located in the same building, and arranged to have the theater's cooling system extended into the cafeteria. It became necessary to enlarge the theater system, this being done at the expense of the Press Cafeteria.

During the first week of the system's operation, the cafeteria's patronage increased approximately 20 per cent, Mr. Hollander said. And he is feeling no "slump" this summer, he reports.

Universal Cooler System

Because the sun's rays beat down upon the flat tin roof of their Jefferson Arms Tea Room in Detroit with such intensity that good patrons went elsewhere to lunch and dine in the summer time, Mrs. B. B. Whitacker and Mrs. J. B. Whittlesey, proprietors, equipped their tea room with an air-conditioning system, and are now, they say, doing the best business in their history.

The proprietors say that in addition to bringing back old customers, the large sign atop the building—stating that the tea room is air-cooled—has attracted much patronage.

They use the "comfort" feature to bring the passerby into their place. They have sought to make their place of business as cool in appearance as in feeling. The room's walls have been finished in a pale green, and the ceiling in a rich shade of cream.

The system was installed by the Conditioned Air Corp. of Detroit, the Universal Cooler Corp. cooperating. Not only does the system cool and dehumidify the air in the room, but it washes the air, and in the winter season cleans and humidifies it.

Spaghetti House Cooled

When the extremely warm weather of last summer descended on Manhattan Island, the Anselmo Spaghetti House, 259 W. 42nd St., experienced a terrific drop in business, along with the rest of the trade. The Anselmo brothers, proprietors of the establishment, were familiar with manufactured weather as used in theaters, and decided to give their patrons its benefit.

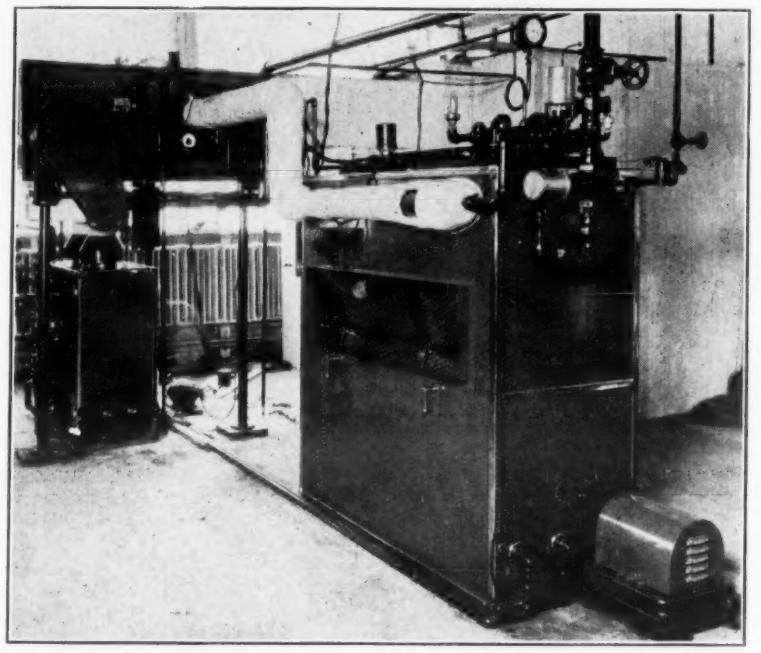
Four Copeland room-cooling units were installed, the customers returned, and the Anselmo brothers expressed themselves as being well satisfied with the fair-sized investment they had made in "manufactured weather."

T. R. Kartsen, manager of Kartsen's Kafeteria in Detroit, who has been in the restaurant business for 18 years, recently installed a Frigidaire air-conditioning system because he was "confident that it would increase his patronage."

Thirteen 1-ton compressors were installed on the mezzanine floor, the restaurant being on the second floor of a Detroit building. The 13 cooling units are of the suspended type, and are placed on walls and columns throughout the large room.

Each of the units operates as a separate system, and is manually operated.

Steam Refrigeration



Carrier's steam ejector is being applied to air conditioning of homes and retail stores. A boiler (left) generates steam which is ejected over a vessel of water in the air conditioner (right).

* * *

Central Steam Used in Carrier Cooling System for Detroit Restaurant

DETROIT—Steam supplied by the Detroit Edison's central steam system which supplies the Detroit downtown district is utilized to air condition Snyder's Coffee Shop at 1526 Woodward Ave., in the first Detroit installation of the Carrier steam-ejector system of air conditioning.

The comfortable atmosphere afforded by the air conditioning in this basement coffee shop has resulted in a 25 per cent increase in patronage and "more compliments than we get on our food—and our food is good, too," states E. Snyder, proprietor.

The conditioned air is diffused and returned to the conditioning chamber through ducts which had been installed for the ventilating system previously used in the store. A filter and a fan which formed part of the old equipment have been utilized in the new system.

Under the stairway at the front of the store, an air-conditioning chamber, in which Aerofin coils have been placed, is interposed in the air path. Water at 45 to 50° F., cooled to that temperature by the steam-ejector system, is circulated through the coils.

The cold-water coils cool and dehumidify the filtered air which is blown across them. A mixture of "fresh" or outside air and recirculated air is blown over the coils, bi-pass dampers regulating the proportion of new air, which is generally 15 to 20 per cent.

After being conditioned, the air enters the room through the ventilating system grilles, which are located near the ceiling. Because of a low ceiling, the vanes in the grille are adjusted to direct the air upward, deflecting it from the ceiling rather than allowing it to blow directly down upon the heads of the patrons. The recirculating intake is located on the wall directly in the rear of the cashier's cage.

The Carrier steam-ejector system of refrigeration by which the water serving as the refrigerating medium is cooled, works on the principle that water under a vacuum will evaporate, or boil at much lower temperatures than under ordinary conditions.

With the equipment in use at Snyder's, water is taken into the machine at 20 lbs. (gauge) pressure and put through an exhauster, which creates a vacuum of 28 in. in the tank in which the water is sprayed through a number of small nozzles.

Then a jet of high velocity steam (coming in from the Edison system at 30 lbs. pressure) is passed over an opening into this tank, quickly completing the vacuum on this tank by sucking out the air and the water vapor given off by the water.

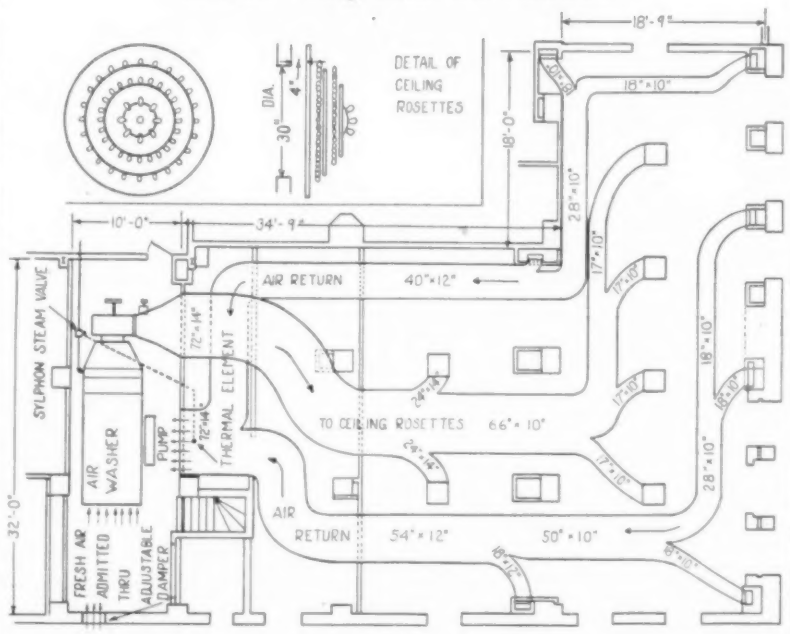
The result is that the water then begins to boil at a temperature approximating 45 to 50° F. The water vapor given off in this process is entrained by the steam and the resultant temperature of the water remaining is sufficiently low to become a medium for the cooling coil.

The cold water is pumped out of the tank and through the cooling coil where it cools the air and is then returned to the tank for recooling by the steam-ejector method.

The system can be used for heating purposes during the winter time by running hot water or steam through the coils, according to engineers of the Wallich Ice Machine Co., Detroit branch of the Carrier Corp., which made the installation.

Temperature control is by a room thermostat which regulates the flow of water through the coils. The proprietor may set the control for any temperature desired that is within the range of the equipment.

Duct Layout in Hotel



Frick engineers laid out the air-conditioning ducts shown above for the Thomas Jefferson Hotel. (See description at right.)

FRICK SYSTEM USED IN SOUTHERN HOTEL

BIRMINGHAM, Ala.—The Thomas Jefferson Hotel here, with 350 rooms and the same number of baths, can boast among other things of a complete new Frick refrigerating and air-conditioning system.

The plant includes two 7x7-in. Frick compressors, a type M.S. condenser, purger, brine-cooling tank with tunnel containing the latest type of coils, a 35-can F-P ice-making system in this tank, float control, piping for a large number of boxes, and trombone coils for an air washer. The washer cools the air for the Coffee Shoppe, ducts being hidden in the ceiling and walls for ventilating the room.

The Haralson Sales Co., Frick distributor for the Birmingham district, made the installation.

Diagram Shows Layout

As shown in the duct layout diagram below, both the supply and return ducts were placed above the ceiling. The supply outlets were placed in the ceiling and were covered over with a plastered grille which also acted as a rosette for the lighting of the Coffee Shoppe.

The return openings were plain square registers like those found in any heating plant, but made of some copper material to enhance the beauty of the Coffee Shoppe as a whole. These return openings were placed about 4 ft. from the floor.

Humidity Control

Temperature and humidity control were effected by simply cooling the air down to the dew point and then reheating it to the proper temperature. In this case, a temperature in the Coffee Shoppe of 78° F. and a relative humidity of 55 per cent were desired. Under these conditions the air has a dew point of about 61° F., Frick engineers show.

Brine coils were placed in the air washer in such a way that the spray from the nozzle falls directly on the coils while the machine is in operation. The temperature of the water was controlled by means of a thermostat placed in the air line directly in front of the eliminator plate.

Thermostat on Brine Pump

This thermostat controls the operation of the brine pump, so that the temperature of the air leaving the washer is about 61° F.

Under extreme weather conditions or when the Coffee Shoppe is full of patrons, the heat required to warm this air to 78° F. is assumed to be supplied by the Coffee Shoppe itself; under these conditions, the air admitted directly into the Coffee Shoppe is about 61° F. and the air returning to the washer practically 78° F. or the same temperature as the air within the Coffee Shoppe about 4 ft. from the floor.

Should the Coffee Shoppe not supply the necessary heat, the temperature of the air returning to the washer will be below this temperature. To compensate for this, the thermal element of the steam supply valve was placed in the return duct where it enters into the fan room.

Valve in Steam Line

This is a 3-in. syphon steam-regulating valve; the valve itself was placed in the steam supply line leading to the Aerofin heater coils, which are directly in the air stream between the air washer and the fan, where the air can be readily warmed as much as desired.

Each of the three brine coils in the washer contained about 185 ft. of 1¼-in. pipe, making a total of 555 ft. They were fed in parallel by a Westco 6F6 brine-circulating pump, directly connected to a 5-hp. motor, giving a capacity of approximately 95 g.p.m. against 100-ft. head.

8,300 Cu. Ft. Per Minute

The total amount of air that can be circulated per minute is 8,300 cu. ft. However, the fan is driven by a 3-hp. variable speed motor and this amount may be reduced to 4,000 cu. ft. per min. Frick engineers believe that they are running on about 6,000 cu. ft. at the present time.

To avoid possible injury to the decorated ceiling, the air supply ducts above were insulated with 1½ in. of corkboard, applied to the duct surface with asphalt paint and additionally secured with two sheet metal screws for each square foot of cork. The height of the ceiling is 13 ft. The fan room was made air tight.

The outside weather conditions were assumed to be 93° F. dry bulb, 82.8° F. wet bulb, and 65 per cent relative humidity. It was estimated that 15 per cent of fresh air should be brought in from the outside. The total amount of refrigeration estimated to take care of the heat lost through the walls, due to the sun effect, occupants, lights, infiltration with the 15 per cent fresh air, and in condensation of moisture, was 17 tons.

Industry Requires Air Conditioning for Processes, Human Comfort

BUFFALO—"Requirements for air conditioning in the industrial field may be divided into two classes: comfort requirements and process requirements, and while these two should be considered of equal importance, the process requirements are usually such that the cost of obtaining the comfort condition along with the required process condition would be prohibitive," stated George B. Bailey, president, Thermal Engineering Co., before the process meeting of the American Society of Mechanical Engineers held here recently.

"Therefore, the average industrial air-conditioning problem resolves itself into one of obtaining most efficiently the desired process condition along with as much of a comfort condition as is possible, in accordance with a justifiable capital, operating, and maintenance expenditure."

Most materials react to changes in the temperature and hygroscopic condition of the air, and when this reaction is such as to interfere with production in a manufacturing process, air conditioning becomes necessary, Bailey pointed out.

Problem Depends on Requirements

"The problem will vary in its degree of complication from a simple application of humidity to offset the intense dryness of winter months to the more involved problem of maintaining a constant temperature and humidity the year 'round," the speaker pointed out.

Process air-conditioning problems are grouped, in about the order of their degree of complexity, as follows by Bailey:

(a) Moderate humidity above a minimum required. Temperature to be maintained above a minimum.

(b) High humidity required. Temperature to be maintained above a minimum.

(c) Low humidity required. Temperature to be maintained constant or operating between a maximum and a minimum.

(d) Constant temperature and humidity required.

Steam Humidification Inexpensive

"To increase the humidity or decrease the hygroscopic condition of the air to meet the requirements of problem (a), water vapor must be added to the air," the speaker said. "The least expensive method of getting water into air to satisfy these requirements is by means of a steam jet. It can also be accomplished by mechanical atomization, air atomization, or with a standard air washer. These methods have been named in about the order of their relative cost.

"Problem (b) is slightly more involved than problem (a), inasmuch as the high humidity requirements necessitate the introduction of humidity in the summer time as well as in the winter. Such a problem faces the average textile manufacturer who desires to maintain humidities of 60 to 65 per cent at about a temperature of 75° F.

"We find that the steam jet can also be applied here but should be limited to winter use only. In years gone by it was customary to introduce steam the year 'round for this purpose, but unfortunately, steam in itself not only supplies the heat of vaporization but the additional heat of the liquid, which resulted in a very uncomfortable summer condition.

Need Humidifying and Cooling

"The additional heat of the steam jet is entirely acceptable in the winter time and helps offset the normal heat losses but, obviously, what is an advantage in the winter time becomes a disadvantage in the summer time.

"Therefore, other methods of humidification were introduced which have a cooling effect when humidifying, due to the absorption of the heat of vaporization from the air. This, of course, is an advantage in the summer time and resulted in the discarding of the steam jet. Most of the later textile installations have been of the mechanical or air atomization type, although the air washer has been used to some extent.

Disadvantage in Winter

"On the other hand, it might be well to call attention to the fact that although mechanical or air atomization is an advantage in the summer time, due to the cooling effect, it is for the same reason a disadvantage in the winter time. Enough additional radiation must be installed in the room being humidified not only to offset the normal heat losses but also to take care of the heat absorbed by evaporation. For this reason it is often necessary to install additional radiation along with a new mechanical or air atomization system of humidification."

The speaker pointed out that a system involving the supplementing of an air-atomization humidifying system by the steam jet would result in several advantages. Not only would it eliminate the necessity of additional radiating surface to supply the heat of vaporization, but it would effect a very considerable saving, inasmuch as the number of atomizing heads would be greatly reduced with an accompanying reduction in operating expense. Provision could be made for heating the water delivered to the atomizer heads which will have somewhat the same effect as humidifying directly with steam.

"The unit air washer and heat may be applied very satisfactorily to the problem," Mr. Bailey stated. "Although the air washer will cool by evaporation in the summer time, by adding heat to the water in the winter time with a steam ejector or indirect heater, the heat of vaporization may be supplied to the water, greatly increasing its humidifying capacity.

"When the water in an air washer is not heated it assumes a temperature corresponding to the wet-bulb temperature of the air in the room, the air leaving the unit being saturated at the wet-bulb temperature.

Offset Cooling Effect

"However, it can readily be seen that as soon as heat is introduced to the water, not only can the cooling effect be offset but the water can be heated up to a comparatively high temperature, with the result that the moisture-carrying capacity of the air circulated through the washer is greatly increased. In this way a comparatively small unit can be used to handle a very large room.

"Another distinct advantage of the air washer unit is the large volume of air circulation resulting in more uniform distribution. One of the disadvantages of the air or centrifugal atomizer is that it gives a localized condition of excessive humidity, which will result in condensation on water pipes, etc., immediately adjacent to the heads unless extreme care is taken as to their location. On the other hand, the air discharged from the unit air washer, although it may be highly saturated, quickly mixes with the surrounding air, thus preventing this condition."

Cooling, Dehumidification Specified

In dealing with problem (c), which confronts the confectionery and gum manufacturer, machine-testing laboratory, low temperature and extreme drying operations, the speaker found that cooling and dehumidification are required along with heating.

These applications, he pointed out, do not require a constant relative humidity, but necessitate the prevention of the humidity getting to a point where condensation or absorption by the materials would take place.

In some of these applications (for instance in the machine-testing laboratory), a perfectly constant temperature is required. However, in others, operation between a minimum and a maximum is allowable, in which case it is obvious that the system should operate at the minimum temperature in the winter time to reduce the heat losses to the outside atmosphere, and vice versa at the maximum temperature in the summer time, to reduce the amount of refrigeration necessary.

Refrigeration for Dehumidification

The heating is accomplished either with ordinary direct radiation or through unit heaters, and the cooling and dehumidification through the unit cooler and air washer. If there is an adequate supply of cold water this may be used for cooling and dehumidification by application through an air washer but, as a rule, it is necessary to go to some kind of refrigeration.

Bailey stated that dehumidification can also be accomplished by passing air over or through absorbent materials having a high affinity for water vapor such as silica gel, calcium chloride, sulphuric acid, etc. This method can be used to advantage on extremely low humidity drying problems where the cost of refrigeration, to get a desired low dew point, would be prohibitive. It can also be used directly on other problems which do not involve the limiting of temperature.

Control 4 Thermal Changes

"The last group to be considered is that in which all four thermal changes of the air must be controlled," the speaker continued. "The specification for group (d) is for a constant humidity or hygroscopic condition and either a constant temperature or a temperature to vary between a minimum and a maximum. More often a constant hygroscopic condition is really the important factor and the temperature can be allowed to fluctuate considerably between a minimum and a maximum.

"The printer, lithographer, paper-products manufacturer, paper-testing laboratory, rayon manufacturer, all come under this group. A constant hygroscopic condition or equilibrium is what they are interested in rather than constant temperatures, inasmuch as these products react but slightly to a change in temperature but very considerably to a change in hygroscopic condition of the air.

"Problem (d) then requires much the same equipment as problem (c), except that humidity must be added to maintain a constant hygroscopic condition. The unit heater and cooler along with control of steam jet is one of the simplest arrangements.

CANDY SHOP EQUIPPED BY UNIVERSAL COOLER

DETROIT—Former experience as a confectioner having convinced him that cool air is one of a confectionery's greatest attractions, H. L. Stimson four weeks ago equipped his new Mary Lee Candy Shop with a Universal Cooler air-conditioning system.

The price of the equipment, Mr. Stimson says, was $1,975. He estimates that the cost of its operation is $2 per day—from 8 a. m. to midnight.

6 Tons of Refrigeration

The system furnishes 6 tons of refrigeration per 24 hrs., and dehumidifies the air in the room approximately 10 per cent. A temperature of approximately 72° F. is maintained.

Due to the fact that no space was available for installation of the conventional Universal cooling unit, special units of the suspended type were employed. One unit is placed on both of the side walls, the casings of each being painted white to match the ceiling and walls.

Three Sirocco Fans

Each unit contains three Sirocco fans, each with a capacity of 1,500 c. f. m., for blowing air across the methyl chloride refrigerant tubes, whose temperature is 40° F.

Two 3-ton condensing units are installed in the basement to operate the system, each being driven by a 3-hp. Wagner motor. The units are water-cooled.

Pressurestat Control

Temperature is regulated by means of a pressurestat on each condensing unit. At a pressure of 18 lbs., the pressurestats set the compressors in operation, and turn them off when a pressure of 35 lbs. is attained.

Since the full refrigerating capacity of the two condensing units is not usually needed to maintain the 72° temperature in the confectionery, the units are both operated at reduced speeds.

FOSTER WHEELER VACUUM SYSTEM GIVES 32° WATER

NEW YORK CITY—Foster Wheeler Corp.'s vacuum refrigeration system will cool water to a temperature of 32° F., according to engineers of the company.

In this system, steam is introduced into a thermo-compressor, from which it is discharged into a condenser. Passage of the steam through the thermo-compressor orifice creates a vacuum which serves to evaporate, and simultaneously cool, water in the flash chamber below the thermo-compressor.

The rotor of a centrifugal pump removes the cold water from the flash chamber and places it in a cold water storage tank. Having been used for purposes of refrigeration, tne water passes into a warm water storage tank, from whence it flows back into the flash chamber to be cooled again by the vacuum in the thermo-compressor.

Another pump circulates water through the condenser to condense the steam from the thermo-compressor, and force the water condensed into a tank, from which it flows back to the boiler to be converted into steam.

HEXCEL RADIATOR BUILDS CONTROL-AIRE HUMIDIFIER

MILWAUKEE—The Hexcel Radiator Co. is manufacturing in two models a portable Control-Aire humidifier suited for the humidification of the five- or six-room house. Its dimensions are 17 x12x12 in.

The humidifier evaporates one gallon of water in two and one-half hours, and provides hot water vapor rather than a cold spray for purposes of humidification. It is designed for 110-volt circuits, and is provided with an automatic cut-off which stops the humidifier when the water supply is exhausted.

The unit built for 110-volt, 60-cycle, a. c. current only, sells for $42.50, while that with a universal motor and current control for 110-volt d. c. or a. c. 25-60-cycle outlets is priced at $47.

PAPER TEST ROOM EQUIPPED WITH FRIGIDAIRE COOLER

ADAMS, Mass.—One of the most accurately controlled air-conditioned rooms in the world is the Frigidaire-equipped paper test room of the Brown Paper Co. here, officials of that concern believe.

This test room must be kept at a temperature of 70° F. and a relative humidity of 50 per cent at all times, the maximum variation allowed being 1° of temperature and 1 per cent of relative humidity.

The room is corkboard insulated and the air is distributed through Coleman-type overhead ducts.

The Frigidaire equipment used on this job consists of cooling coils, compressors, heating elements, and a bell-type humidifier.

You Can Make Money the Whole Year Round by Selling

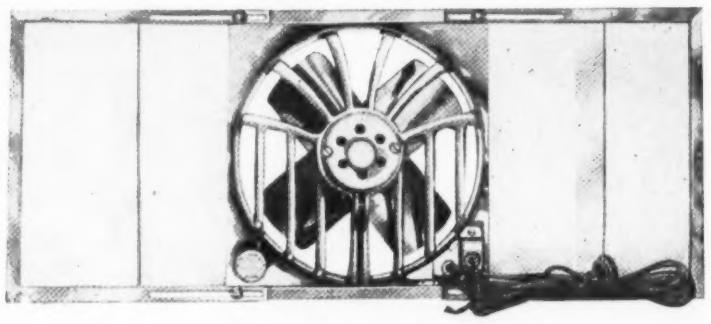
MOTOVENT

The way to - CLEAN AIR

THERE is a big market for home ventilators. People are increasingly conscious of the advantages of a constant supply of clean fresh air in their homes. Every housewife knows the problem of keeping kitchen air cool and clean and bathroom air always fresh. "Conditioning" is not complete without proper ventilation.

MOTOVENT actually changes room air every four minutes. Cooking odors, smoke and steam are whisked away like magic. There is healthful ventilation the whole year round—for kitchen, bathroom and the entire house.

MOTOVENT is easily installed in any window. It operates economically. Its pleasing design and attractive finish make it a thing of beauty as well as utility.



Model 500 Retail Price $24.50

DESIGNED WITH THE HELP OF THE HOUSEWIFE

In building MOTOVENT, the woman's point of view has been considered in every detail. The attractive chromium plated parts and polished aluminum castings without corners or pockets, accelerate air flow and simplify cleaning. A simple cord pull starts and stops the fan. The use of one of America's leading induction type motors assures quiet trouble-free service day and night.

INSTALLS IN ANY WINDOW—PORTABLE

All that has to be done to install the MOTOVENT is to screw two brackets to either the top or bottom of the window sill in any room—then sliplock the portable MOTOVENT into these brackets. Patented telescoping plate glass allows adjustment of the MOTOVENT to any average window without obstructing the view or interfering with shades or curtains.

ATTRACTIVE DISTRIBUTOR AND DEALER PROPOSITION

MOTOVENT is the world's lowest priced home ventilator. There are models to retail from $24.50 to $49.50—on all models an attractive margin of profit is allowed distributor and dealer. We invite inquiries concerning our franchise details.

FRED'K N. ROSS, Inc.

1010 Beaubien St. Detroit, Mich,

Air-Conditioning Directory Classified by Functions

SUMMER AND WINTER FUNCTIONS	Summer Functions		Year 'round Functions		Winter Functions	
	REFRIGERATION	DEHUMIDIFICATION	CLEANING	CIRCULATION	HEATING	HUMIDIFICATION
American Blower Corp., 6000 Russell St., Detroit, Mich. Series "O" Sirocco	Ice water or refrigerating machine	Cold surface		Sirocco fans	Hot water	
American Blower Corp., 6000 Russell St., Detroit, Mich. Series "R" Sirocco	Ice, tap water or electric refrigeration	Cold water surface	Bag filter	Sirocco fans	Hot water	Water spray atomizer
American Blower Corp., 6000 Russell St., Detroit, Mich. Industrial	Mechanical refrigeration (Central system)	Cold water spray	Water spray or filter	Fans	Steam	Water spray
American Furnace Co., 2125 Morgan St., St. Louis, Mo. Afco Duo-Blo	Electric refrigeration	Cold evaporator surface	Filter	Centrifugal blower unit	Warm air	Water spray
Air-Control Systems, Inc., 2240 N. Racine Ave., Chicago, Ill. Zephyr Air	Electric refrigerator supplies ice	Cold finned core and cold spray	Dense water spray	Blower type fan	Steam or hot water	Dense water spray
Betz Unit Air Cooler Co., Inc., 6 W. Ninth St., Kansas City, Mo. Unicool	Ice or electric refrigeration	Cold water spray	Water spray	Fan	Steam or hot water	Water spray
Campbell Metal Window Corporation, Pershing Square Bldg., New York, N. Y. Campbell and Maxim Silencer	Electric refrigeration	Cold evaporator surface	Filter	Fan	Steam or hot water	Evaporation by heating water
Chicago Pump Co., 2336 Wolfrom St., Chicago, Ill. Northern Breeze	Ice	Cold surface of fin-type radiator	Water	Blower		Evaporation by heating water
Conditioned Air Corporation, Ford Bldg., Detroit, Mich. Airco	Electric refrigeration	Cold evaporator surface	Filter and water spray	Fan and blower assembly	Steam or hot water	Evaporation by heating water
The Corozone Company, 110 Hanna Bldg., Cleveland, Ohio DeLuxe Aquazone	Puddling of water and use of ice	Copper refrigerant fins	Water current or spray	Fan		Evaporation by heating water
Economy Baler Company, Ann Arbor, Mich. Health-Air Systems	Not furnished but can be used with refrigeration systems	Cold water spray if tap water is cold enough or refrigeration system is used	Water spray. Filter can be used in conjunction	Blower	Steam, hot water, or warm air	Water spray
The Edwards Manufacturing Co., Cincinnati, Ohio Hot-Kold	Electric refrigeration	Cold evaporator surface	Filter	Centrifugal fan, dual speed	Warm air	Uses distilled water from flue gases
Frigidaire Corp., Third National Bank Bldg., Dayton, Ohio	Electric refrigeration	Cold evaporator surface	Filter optional	Fan	Steam or hot water	Evaporation by heating water
Hess Warming & Ventilating Co., 1211-17 S. Western Ave., Chicago, Ill.		If tap water is cold enough	Filter	Centrifugal blower		Wire mesh wheel breaks up water into fine spray
Holland Furnace Company, Holland, Mich.	Refrigeration unit optional	Cold water spray	Filter and water spray	Multi-vane LS fans	Warm air	Water spray
Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago, Ill. Ilg and Ilg Kold	Electric refrigeration or ice	Cold evaporator surface	Filter	Fan	Steam or electricity	Evaporation by heating water or patented wick principle
H. S. Kaiser Company, 936 W. Chicago Ave., Chicago, Ill. Kaiseraire	Ice	Cold ice surface	Filter	Fan		Evaporation by heating water
King Ventilating Co., Owatonna, Minn.	Electric refrigeration or ice	Spray	Water spray	Blower		Water spray
Koolair Maker Corp., 4485 Olive St., St. Louis, Mo.	Electric refrigeration or ice	Cold water spray	Water spray	Fans	Steam, hot water, electricity or gas	Water spray
Lewis Air Conditioners, Inc., 829 Second Ave., South, Minneapolis, Minn.	Circulates ice water through heat absorber	Cold surface of heat absorber	Filters	Fan	Steam or hot water	
McCord Radiator & Mfg. Co., 2587 E. Grand Blvd., Detroit, Mich. Convector	Circulates cold water cooled by electric refrigeration or ice	Cold evaporator surface	Moist surfaces	Fan	Hot water	
J. H. McCormick & Company, Williamsport, Pa. Airtrol	Electric refrigeration or cold water cooled by electric refrigeration or ice	Finned radiator surface	Filters	Fans	Steam	Wicks controlled by hydrostat
L. J. Mueller Furnace Co., 197 Reed St., Milwaukee, Wis. Climator	Electric refrigeration can be applied	Cold evaporator surface or cold water spray can be applied	Filter and water spray	Blowers	Warm air	Water spray
National Korectaire Sales Co., 228 N. LaSalle St., Chicago, Ill. Korectaire	Ice or cold water from well or cooled by electric refrigeration	Cold dry evaporator surface and cold water surface	Impingement on moving water surface	Cone fan	Steam or hot water	Evaporation
Niagara Blower Company, 6 E. 45th St., New York, N. Y.	Electric refrigeration or ice	Cold evaporator surface or cold water spray	Filter and water spray	Fans	Steam	Water spray and evaporation by heating water
Parks-Cramer Co., Fitchburg, Mass. Parkspray Certified Climate	Electric refrigeration	Cold water spray or evaporator surface	Filter and water spray	Fan	Steam, hot water, warm air or electric heaters	Water spray
Premier Warm Air Heater Co., Dowagiac, Mich.		Cold water spray	Filter and water spray	Twin blowers	Warm air	Water spray
Rudy Furnace Co., Dowagiac, Mich. Rudy Bon-Air		Water spray	Water spray	Blower	Warm air	Water spray or humidifier
Servel Sales, Inc., Evansville, Ind.	Electric refrigeration	Cold evaporator surface	Filter	Blower fan	Steam	Water spray
B. F. Sturtevant Company, Hyde Park, Mass.	Electric refrigeration or ice	Cold evaporator surface or water spray	Filter or water spray	Fans and blowers	Steam, hot water vapor or warm air	Water spray and evaporation by heating water
Thermal Units Mfg. Co., Pershing Rd. & Loomis St., Chicago, Ill.	Electric refrigeration or ice	Cold evaporator surface	Filter optional	Fans	Steam or hot water	
The Trane Company La Crosse, Wis. Climate Changer	Electric refrigeration, ice or cold water	Cold evaporator surface or cold water	Filter and water spray	Fan	Steam or warm air	Water spray
United States Blower and Heater Corp., 2131 Kennedy St., N. E., Minneapolis, Minn. Kooler-Aire, Arctic Nu Air and Balmi-Aire		Cold water spray when and as required	Water spray or flooding nozzles	Centrifugal fan	Steam, hot water or warm air	Water spray
Universal Cooler Corp., 7424 Melville Ave., Detroit, Mich.	Electric refrigeration	Cold evaporator surface	Filter and water spray	Fan	Steam	Water spray
The Williamson Heater Company, 337 W. 5th St., Cincinnati, Ohio DeLuxe Comfort System	Electric refrigeration or ice	Cold evaporator surface	Adhesive type filters	Centrifugal blowers	Warm air	Automatic drip humidifier
X L Refrigeration Co., Inc., 1834 W. 59th St., Chicago, Ill. Hilger	Electric refrigeration	Cold water or brine spray	Water spray	Fans	Steam	Water spray
York Ice Machinery Corporation, York, Pa.	Electric refrigeration or ice	Cold evaporator surface or water spray	Water spray and filter	Fans through ducts or direct	Steam or warm air	Water spray and evaporation by heating water
SUMMER FUNCTIONS						
Carrier-York Corp., Philadelphia, Pa. Carrier	Ice	Cold evaporator surface		Blower		
ChilAire Corporation, 3115 Troost Ave., Kansas City, Mo.	Ice	Cold absorber surface	Water spray	Sirocco type fan		
Copeland Products, Inc., Mt. Clemens, Mich.	Electric refrigeration	Cold evaporator surface	Filter through coils	Fan		
H. S. Kaiser Company, 936 W. Chicago Ave., Chicago, Ill. Ice Air	Ice	Ice surface		Fan		
Lewis Air Conditioners, Inc., 829 Second Ave., South, Minneapolis, Minn.	Ice	Cold surface		Fan		
Marlo Electric Corporation, 5241 Botanical Ave., St. Louis, Mo.	Electric refrigeration	Cold evaporator surface	Filter	Blower type fan		
Standard Engineering Works, 4343 Duncan Ave., St. Louis, Mo. Kool-A-Room	Ice	Cold copper fins	Bag filter	Sirocco fans		
The Vilter Manufacturing Company, 2234 S. 1st St., Milwaukee, Wis.	Mechanical refrigeration	Cold surface		Fan		
Wepsco Steel Products Co., Blue Island, Ill. Roto Cold	Ice	Cold surface of ice container	Wet ducts	Fan		
WINTER FUNCTIONS						
The Bryant Heater & Mfg. Company, 17825 St. Clair Ave., Cleveland, Ohio Dualator			Filter	Large volume fan	Steam condenser	Heating water in pan
Dail Steel Products Co., Lansing, Mich. Dailaire			Filter and water spray	Blower	Warm air	Water spray
The Fox Furnace Company, Elyria, Ohio Sunbeam and Gas Automatic			Filter	Blower	Warm air	Water spray
General Electric Company, Air Conditioning Dept., 120 Broadway, New York, N. Y.			Dry filters	Squirrel cage blowers	Steam	Hot water flowing over sets of screens
Home Furnace Company, Holland, Mich.			Filter and water spray	Blower	Warm air	Water spray
W. E. Kautenberg Co., Freeport, Ill. Marvel				Fan	Electric heating wire	Evaporation by heating water
Lennox Furnace Co., Marshalltown, Iowa Aire-Flo			Filter and water spray	Blower	Warm air	Water spray or evaporation by heating water
Motor Wheel Corp., Lansing, Mich. Motor Wheel Weather Control			Filter or water spray	Blower	Warm air	Evaporation by heating water
Swartzbaugh Mfg. Co., 1336 W. Bancroft, Toledo, Ohio Kienzair			Water spray	Fan		Quadruple water spray
American Air Filter Co., Inc., 215 Central Ave., Louisville, Ky. Airgard, American Air Filter			Filter	Available in either circulating or non-circulating type		
A. C. Gilbert Co., New Haven, Conn. Airifier						Humidifies only by breaking up water into a mist

Air-Conditioning Exhibits Open In Three Cities

THOUSANDS INSPECT ST. LOUIS DISPLAYS

ST. LOUIS—Thousands of people have filed through the main floor of the central office of the Union Electric Light & Power Co. here during the past month to view the exhibit of the St. Louis Air Conditioning Bureau, said to be the first cooperative enterprise in the field of air conditioning.

The exhibit was opened on July 5, with 18 displays of air conditioners or equipment which forms a part of air-conditioning systems. A spectacular sign superimposed on the corner of the building and carrying the slogan "Keep Cool, St. Louis" along with two large windows advertising the exhibit, constituted the only promotional effort to attract the public during the first two weeks, but throngs running into the thousands visited the exhibit from the first day on, according to A. E. Schanuel, director of the bureau.

At the end of the first two weeks, a special direct-mail promotional campaign was sent to a selected list of 10,000 names. These names were taken from the utility's record of "high income" groups which could afford comfort cooling, and to offices of professional men. This activity has resulted in an increase in the number of interested visitors, Schanuel reports.

Make Public Conscious

The principal idea behind the exhibit is to make the public conscious of the fact that air conditioning is now available for the "home and office." To emphasize this fact, the exhibit is divided into two parts.

On the main floor of the Union Electric Light & Power Co. building are the unit coolers and exhibits of the parts of air-conditioning equipment as they would appear in living rooms or offices. This floor is air conditioned by a central system, the crowd thus getting the effect of the equipment, although none of the conditioners were operating.

In the basement is the equipment that does the actual work of air conditioning, such as the refrigerating machinery, and the complex central systems that provide for year 'round air conditioning.

Visitors who evince more than a casual interest in the first-floor display are directed to the basement, where three engineers of the Union Electric Light & Power Co. have been kept busy explaining the operation of the equipment, and answering questions of the visitors.

Secure Prospect's Names

No selling is being done during the exhibition, but the engineers secure the names of those who express an interest in the possibilities of comfort cooling in their homes or offices. These names are turned over to factory representatives of the equipment for follow-up.

The excessively hot and humid weather experienced in St. Louis during July has been one of the best "promoters" for the exhibit, Schanuel states. Hotels, restaurants and railroads have done much in their advertising to educate the public to the advantages of air conditioning, which has helped the exhibit.

The success of the exhibition has helped to solidify the formation of the St. Louis Air Conditioning Bureau, Schanuel says, and the plan committee of the bureau has developed a plan for an immediate follow-up campaign of newspaper advertising to capitalize on the interest shown by the public in air conditioning.

Mechanical Coolers

Frigidaire, Carrier and Copeland displayed air-conditioning equipment in which the cooling effect was furnished by compressors of their own make. The Trane cooler was operated with a Marlo compressor.

Ice-cooled air-conditioning cabinets included makes by ChilAire, Carrier-York, Ilg-Air, Kool-A-Room, Kold Air, and Modine. The ice was furnished by the Polar Wave division of the City Ice and Fuel Co., and the Merchants Ice and Coal Co.

Complete home air-conditioning plants are represented by the Sirocco conditioner, in which ice is used for cooling, and also by the Afco Duo-Blo hot-air heating system which is an assembled unit for complete air conditioning—with York compressor and coils, and Emerson fans and humidifiers.

The St. Louis Refrigerating and Cold Storage Co., which supplies a number of large installations with refrigerant through a pipe-line system, also had an exhibit.

Member companies of the newly-formed St. Louis Air-Conditioning Bureau and their acting bureau representatives, are as follows:

American Furnace Co., H. V. Bayse, president and Clarence S. Frank, secretary; American Air Filter Co., Inc., Dwight L. Moodie; American Blower Corp., T. W. McMahon, district manager; Artophone Corp., H. S. Schiele, vice president, and H. L. Pieper, manager, commercial department.

Ball Ice Machine Co., L. B. Von Weise, president; Carrier-York Corp., George Myers, district sales manager; ChilAire Corp., G. F. Sparks, factory representative; City Ice & Fuel Co., J. E. Muckerman, vice president and general manager, T. J. Beck, sales promotion manager, and G. E. Chamberlain, plant superintendent.

The Del-Home Light Co., W. O. Waldsmith, president, A. J. Warner, commercial sales manager, and H. P. Materne, sales manager of air conditioning division; Ilg Electric Ventilating Co., H. W. Elkins, district manager; Koolair-Maker Corp., Sam Kauffman.

Merchants Ice & Coal Co., P. E. Conrades, president, C. W. Avis, assistant secretary, and Henry Rosenow, engineer; Modine Manufacturing Co., R. J. Smith; St. Louis Refrigerating & Cold Storage Co., R. H. Switzler, vice president; A. J. Hecker, mechanical superintendent.

Standard Engineering Works, W. E. Fuetterer, vice president and general manager, and R. W. McDonald, chief engineer, air conditioning department; The Trane Co., H. E. Jacobsen; York Ice Machinery Corp., E. P. Edwards, sales manager, and L. J. Dubois, air conditioning engineer.

Sodemann Heat & Power Co., William Sodemann, president; S. C. Sachs, Inc., S. C. Sachs, president; St. Louis Electrical Board of Trade, Carl Christine, secretary; Union Electric Light & Power Co., C. E. Michel, and E. A. Freund.

Comfort Coolers Shown in Chicago

Manufacturers of air-conditioning equipment are displaying their lines in a show sponsored by Commonwealth-Edison Co., Chicago. The average daily attendance was 3,000 and 108 sales were made in two weeks. In this same period, 1,265 prospects for air conditioning were secured.

SEVEN ICE ROOM COOLERS SHOWN IN DETROIT DISPLAY

DETROIT—Seven manufacturers of ice room coolers have their products on display at the Comfort Cooling Bureau here, sponsored by 12 Detroit ice manufacturers through the Detroit Ice Publicity Association. The display is at the association's headquarters in the Lafayette Building.

The appliances displayed and their manufacturers are as follows:

Aquazone, Corozone Co., Cleveland; Lewis Air Conditioner, Lewis Air Conditioners, Inc., Minneapolis; Modine Ice Fan, Modine Mfg. Co., Racine; Carrier-York room cooling cabinet, Carrier-York division of Carrier Corp., Newark; a model 45 Sirocco cooling and heating unit, and a model 2 Sirocco ice melting tank, American Blower Corp., Detroit; Ilg cooling unit, Ilg Electric Ventilating Co., Chicago; McCord Convector, McCord Radiator Co., Detroit.

A Palmer pump, manufactured by the Palmer Electric Co. of Detroit, is also being exhibited.

The Sirocco cooling and heating unit, the Ilg cooling unit, and the McCord convector are operated interchangeably from the Sirocco ice melting tank.

Electric current and ice for the units are furnished by the publicity group.

The association's representative locates prospects for cooling equipment, estimates the load of the residence or business establishment, and then places this information, with the prospect's name, on record at the association headquarters.

Exhibitors at the air-cooling display are then privileged to send their salesmen to these prospects.

Ice Industries Prepare Cooling Manual

CHICAGO—A complete sales and development program, comprised of seven separately bound sections, each devoted to some phase of comfort cooling with ice as the refrigerant, has been prepared by the offices of the National Association of Ice Industries for use by its members.

The first part presents the reasons why air conditioning is necessary for comfort and health, pointing out that the ideal atmospheric condition for the comfort and health of a normal adult is from 67 to 69° F., dry-bulb temperature, 40 to 60 per cent relative humidity, with an air movement of 25 to 50 ft. per minute. The control of these three cardinal factors—dry-bulb temperature, relative humidity, and air motion—is necessary to maintain healthful and comfortable conditions, the booklet relates.

The first section then goes on to tell of the various methods of accomplishing comfort cooling, the place of ice as a cooling medium, and specific markets for air-conditioning equipment.

"Organizing to Sell Comfort Cooling" is the title of the second piece. Concentration on "key markets," (those of least resistance) is advised. Suggested sales policies include building of customer acceptance by making installations where the greatest number of people will be able to enjoy the benefits of comfort cooling, making sound installations, and providing competent counsel. An outline is made of a proper sales organization for ice companies intending to enter the air-conditioning field.

Part No. 3 is a "Comfort Cooling Sales Manual" for air-conditioning salesmen. It is a presentation sheet for prospects, and in addition to reviewing most of the material in part 1, it presents data on the way in which heat penetrates into a room, or is given off by human and mechanical working operations.

Pictures of ice comfort-cooling installations, in combination with advertising material directed to the prospective user, are presented in section 4. There are also data on ice consumption and performance, in conjunction with a sample temperature chart. This section is bound in loose-leaf form so that material may be added to it.

Section 5 is given over to a specimen proposal, in which a method of presenting the proposal in written form is illustrated, and suggestions made for methods of incorporating the contract for ice supply, and the handling of other matters in connection with closing the contract.

A list of manufacturers and installation organizations is given in section 6. The section is designed to facilitate the establishment of cooperative contacts between the ice manufacturer and the sources of ice air-conditioning equipment. The various services are listed alphabetically and a short summary is given of the products and services offered.

Section 7 is the "Engineer's Manual." It contains a model engineer's information sheet, and explains in detail the methods of calculating the cooling load, giving tables for several fundamental factors.

AIR CONDITIONING TO BE SHOWN AT FAIR

CHICAGO—Plans for the extensive exhibition of air-conditioning equipment at "A Century of Progress," Chicago's 1933 World's Fair, have been outlined by those in charge of the industrial arts exhibits.

Eight residences demonstrating new uses of building materials, etc., will be constructed on the fair grounds, all of which will demonstrate some phase of air conditioning or humidity control. Some will be cooled; in some the air will be washed.

Air-Conditioning Building

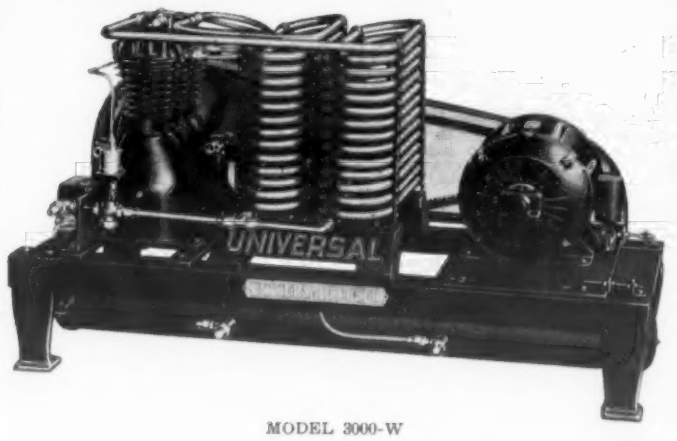
A special air-conditioning building, located adjacent to the housing exhibit, will show the newest developments in insulating materials, glass, heating and cooling systems, blower systems, and other devices contributing toward more comfortable and healthful homes.

The size and scope of this building, for which final plans have not yet been drawn, will depend on the interest shown in such exhibits by the various companies in the industry, it was stated.

Humidifiers and humidity-control systems, unit ventilators and unit heating devices, steam and hot water specialties, temperature regulators, air filters, ozone apparatus, insulation, concealed radiation, etc., will be included in the exhibit.

Already erected or nearly so are the Administration building, the Hall of Science, the Radio, Communications and Electrical buildings, the replica of old Ft. Dearborn, and the Travel and Transport building.

Air Conditioning and Universal Coolers



MODEL 3000-W

HUNDREDS of dealers will make thousands of dollars selling to the almost unscratched air conditioning market during the next few years. Some will sell untried equipment on a strictly price basis in an endeavor to secure "quick" sales. Others, with an eye to the future, will handle only proven equipment that will "stand up" on the job. Universal offers dealers this latter type of equipment. The entire line is designed and built for service, above all else, is unusually complete, and has earned an enviable reputation during the ten years it has been on the market. The 3-cylinder, 3-H.P. unit, shown here, was designed especially for air conditioning work, is capable of producing 3 tons of refrigeration, and is built to give uninterrupted, trouble-free service—indefinitely.

Complete details upon request

Universal Cooler Corp.

Detroit, Mich. Brantford, Ont.

UTILITY CO. STUDIES TRIAL INSTALLATIONS

By Elston D. Herron

DETROIT—Eight installations of air-conditioning equipment—four mechanical systems and four ice coolers—have been made by the Detroit Edison Co. in some of its properties, primarily for the purpose of studying such equipment to determine its effectiveness, costs, and service problems. All of the installations have been made this summer.

A Wittenmeier carbonic system is used at the company's Ann Arbor sales office; at the Port Huron office is an ice cooler designed by company engineers. Similar equipment is installed at the Farmer St. sales room in Detroit. Frigidaire equipment is used at the office in the General Motors Bldg., Detroit.

An ice-cooling system is installed in the home of a company employe in Birmingham, Mich., while another ice cooler is in process of installation at the Birmingham office. An ammonia system using a Vilter compressor is installed in the company's research laboratory. Two office rooms are equipped with a Carrier system, using mechanical refrigeration.

The equipment installed in sales rooms and offices is designed not only to serve as a basis for study of air conditioning, but is used to increase comfort of patrons of the company who call to transact business or buy appliances, according to S. S. Sanford, sales engineer. No air-conditioning equipment is being sold by the utility company, however.

The cooling system at the Farmer St. sales room was installed in conjunction with the existing heating and ventilating system, and uses the ducts and fans already installed. Only the addition of the ice-melting tank, water pump, cooling unit, controls and connections was required to complete the cooling system installation.

The system supplies 17½ tons of refrigeration to the building, which has an inside volume of 57,000 cu. ft. The fan capacity is 6,500 c. f. m. The estimated cooling load, due to lights and appliances in the building, is 37,200 watts.

The ice tank, having a capacity of 618 cu. ft., is located in the basement, and is supplied with ice by means of a chute leading to the basement from the sidewalk outside. The ice blocks float in water in the tank, thoroughly chilling when necessary, by exhausting water which has just returned from the cooling unit.

Chilled water from the tank is pumped to the cooling coils and fan on the mezzanine floor. Temperature of the water in the coils is regulated automatically to maintain a constant dew point of the air passing through the cooler.

This is accomplished by means of a thermostat in the air stream at the coils which actuates a mixing valve in the pump suction. The valve mixes return water with cold water to maintain the dew point desired. The temperature in the building is maintained with a Raymond Duo-stat, which adjusts the inside temperature to the outside temperature, by starting or stopping the pump as required.

At night, the pump is shut down, and the fan is left running, to circulate outside air through the building. Inlet grilles are placed in the walls beneath the mezzanine floor and in the show windows. Outlet grilles are at the ceiling and along the floor line.

With an outdoor temperature of 95° F. an 80° dry-bulb temperature and a 65° wet-bulb temperature are kept inside. At 90° outside, a 79° dry-bulb temperature and a 64.5° wet-bulb temperature are maintained inside. When the temperature is 85° outside, a 76.5° dry-bulb temperature and 64° wet-bulb temperature are held within.

At an 80° outdoor temperature, a 75° dry-bulb temperature and a 63.5° wet-bulb temperature are maintained inside. When the outside temperature is 75°, a 73.5° dry-bulb temperature and a 63° wet-bulb temperature are held inside. At a 70° outdoor temperature, a temperature of 72° dry-bulb and 52.5° wet-bulb is maintained inside.

The ice-cooling system installed at the Birmingham residence also makes use of the existing forced warm air heating system and air ducts.

The ice-melting tank is buried in the ground outside the house. This is an ordinary 500-gal. fuel oil tank which will hold approximately 2,000 lbs. of ice, partially submerged in water.

Other equipment used consists of a set of cooling coils, a cold water pump, an air filter, and a fan for blowing cooled air through the ducts. The cooling coils are sections of standard automobile radiators.

These coils are installed in two units. The upper unit, twice as large as the lower one, may be supplied with city water to cool the air partially, while the lower unit is supplied with ice water from the pump. It is estimated by Detroit Edison engineers that use of the city water in this manner reduces ice consumption about 50 per cent.

Use of awnings or blinds at the windows lessens the cooling load by the equivalent of approximately 148 lbs. of ice per hour, engineers estimate.

Maximum cooling requirements for the house were computed on the basis of an outdoor temperature of 95° F. Assuming that there are approximately 30 days during the summer when considerable cooling is desired, engineers estimate that the cooling load on these days will amount to the melting of 156 lbs. of ice per hour, or 1,248 lbs. daily.

Allowing for losses caused by warm earth around the ice-melting tank, it is estimated that the total season's requirements will approximate 20 tons of ice, and that the operating cost will range between $60 and $90 per summer.

it. A float valve on the tank regulates the water level, and drains off water,

How To Sell Air Conditioners

As Practiced By Trilling & Montague, Inc.

PHILADELPHIA — Selling organizations which are handling air-conditioning equipment must "move fast" because of the short duration of the selling season, and to reach the greatest number of prospects in the shortest time, should center their sales efforts upon certain classes of prospects who appear to be able to buy "comfort" equipment, believes David M. Trilling of Trilling & Montague, Inc., Norge distributor which has recently taken on the Carrier portable room cooler.

"At the present time the market is confined to people who are financially able to buy 'comfort,' and there are many 'suspects' that must be weeded out before one arrives at real prospects," Trilling states.

Mr. Trilling classes these as real prospects at this time: hotels, hospitals, physicians, dentists, beauty parlors, funeral parlors, barber shops, executive offices and similar establishments.

"In order to make contact with these respective fields most quickly, we called upon the wholesale outlets which served them and acquainted them with the fact that a well-trained selling organization for the Carrier room cooler was at their disposal.

"This organization would call upon a selected clientele which they, the wholesalers, might indicate as the best prospects for the equipment. There would be no interference with the regular sales activities of the wholesale houses and the liberal discounts which we offered could be looked upon as 'plus' profits entirely.

"This 'wholesale' activity was our major effort, in addition to our own seeking out of prospects in other classes than those enumerated.

"But this direct selling activity, necessarily, represents pioneering effort which, as has been said, involves considerable lost motion. The salesman in this field today must have tangible prospects to work upon in order to effect the greatest number of sales in the short season still before him.

"Experimentally, a small appropriation has been made for expenditure in radio broadcasting. The chief purpose is to reach 'the market of necessity'—invalids and shut-ins, who are dependent upon the radio to fill in many idle hours. In an effort to reach this market, there has been prepared a schedule of short broadcasts several times a day.

"The nature of the commodity and the limitation of its usefulness to the comparatively short season of hot and humid weather necessitate its sale on either a cash basis or on short terms of 30, 60 or 90 days. Finance companies do not care to underwrite an article on which payments must continue to be made during lengthy periods when it is not actually in use.

"We have found that ice companies are willing to lend their cooperation in every way possible. The portable room coolers open up a new market for them which they are naturally desirous of exploiting. In fact, one ice company has assured us that they would take care of the ice service as well as the draining of the water in our room coolers throughout the extensive territory which they service."

HOTEL SYSTEM COOLS IN SUMMER, HEATS IN WINTER

SPRINGFIELD, Mass.—Air-conditioning equipment which performs the dual service of cooling in the summer and heating in the winter has been installed in the main dining rooms of the Highland Hotel here, recently.

In summer this equipment cleanses and cools the air, removes all excess humidity and circulates it throughout the room. In winter it likewise washes the air, heats it, restores any lacking humidity and circulates it.

This is accomplished by the installation in the basement of four 3-ton Frigidaire electrically operated compressors, and in the dining room upstairs of seven ceiling and five floor units.

The floor units, which have the appearance of radio consoles, are equipped with both cold and steam coils, the latter to be utilized only in the winter.

The refrigerant used is F-12. Two blowers, with a capacity of 18,000 and 20,000 cu. ft. of air respectively, keep the atmosphere of the dining rooms in constant but indirect circulation.

The larger of the rooms is 60x100 ft., and the smaller adjoining room is 22x64 ft. They seat about 200 people at one time. Manager George G. Jahrling estimates the cost of operating the system will be about $100 a month.

KLENZAIR DISTRIBUTOR FOR MICHIGAN IS APPOINTED

DETROIT—Klenzair air-conditioning fans are now being sold here by the Michigan Klenzair Co., distributor for the state of Michigan. Clifford Christiansen is president and Robert Hubbert is secretary and treasurer.

This organization is selling through two department stores here, as well as at its headquarters. The air conditioners are on sale at J. L. Hudson Co. store in the electrical appliance department, and in the Ernst Kern store, in the drug department. Distributorship salesmen are selling in these stores.

According to Hubbert, the distributorship will take care of the whole of Michigan, the state being divided into five territories. Sub-distributorships will be organized and the managers will work on commission, having their own salesmen.

The Detroit section is the only part of the state to be opened up as yet, but in this district alone, 150 machines have been sold since June 1, states Hubbert. Many of these sales have been resales, a second machine being sold to one customer.

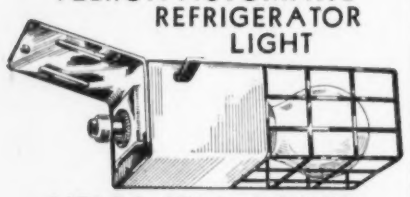
1,500 UNDERTAKERS BUY KLENZAIR UNITS

TOLEDO—More than 1,500 undertaking establishments have purchased Klenzair units for use in their chapels and undertaking rooms, according to Ted Swartzbaugh, sales manager of The Swartzbaugh Mfg. Co.

Swartzbaugh has just returned from a trip through key cities of the East and Middle West. Klenzair distribution is being handled through electric appliance wholesalers, department stores, and central stations, he states.

One Klenzair salesman he met on this trip, Mr. Swartzbaugh reports, sold eight machines in a day.

FLERON AUTOMATIC REFRIGERATOR LIGHT



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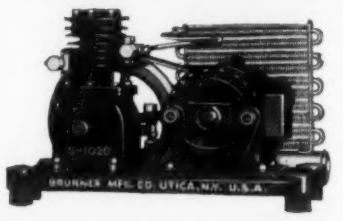

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Fits all cabinets, with or without legs, or in the crate. Capacity, 1,200 lbs. All steel frame, 4" rubber tired wheels, one truck with top casters and handles for tilting and rolling into delivery truck and on the stairs. Only pads touch cabinet Last a lifetime. Complete set $34.50. Ball bearing swivel casters on one end, $5 extra.

X-60 REFRIGERATOR TRUCKS
Handle leg cabinets only. Per set, $31.50. Spring steel hooks to convert into X-70 available separately. Ball bearing swivel casters on one truck, $5 extra.

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HOUSEHOLD ELECTRIC REFRIGERATOR SPECIFICATIONS

Detailed specifications for 342 models made by 49 different manufacturers are tabulated in the June 29, 1932, issue of ELECTRIC REFRIGERATION NEWS.

Send $1.00 for 17 weeks trial subscription and indicate that you want the June 29 issue included. A limited number of extra copies are now available.

Electric Refrigeration News, 550 Maccabees Bldg., Detroit

KELVINATOR 'HORSES' START THIRD EVENT

(Concluded from Page 1, Column 2)

third place. Cleveland and Greenville, S. C., are bunched in fourth place.

Alexandria, Va., running strong in second place at the first turn, came up to overtake Denver for first place. C.I.P.S. Co. continued to run a steady third.

Clarksburg, W. Va., drew away from Wheeling, W. Va., to an undisputed lead on the Belmont track. Poughkeepsie, N. Y., is right behind.

The battle at Latonia seesawed again to give Hagerstown, Md., a lead over Little Rock, Ark., the leader last week. The Williamsport, Pa., horse closed with a rush to regain the third money position, pushing Flint, Mich., down to fourth place.

The pace at Hawthorne picked up, with Birmingham, Ala., still holding the lead. Boise, Idaho, a little but speedy horse, came up to the place position, and Indianapolis dropped back to third. Lancaster, Pa., is moving up fast.

Hazleton, Pa., hung on gallantly to her lead on the Laurel oval, with Phoenix, Ariz., and Nashville, Tenn., on her heels.

Erie, Pa., and Ft. Worth, Tex., still look to be the class of the Bowie track, running easily in the first two positions, but Norfolk, Va., nosed out Bangor, Me., to take third position at the rail.

Welch, W. Va., Charleston, W. Va., and Fernwood were still one-two-three at Washington Park, but are facing pressure from some of the horses that were slow starters.

At Fairmont, Casper, Wyo., fooled the wise boys to make a quick jump from third to first position. The little mustang left Davenport, Iowa, in second position, and Gulfport, Miss., third.

C.I.T. Earns Profit For 1st 6 Months

(Concluded from Page 1, Column 1)

all determinable and known losses have been written off, and reserves are considered adequate to protect the corporation against possible future losses.

The balance sheet as of June 30 showed total current assets of $136,351,359 against current liabilities of $24,692,090, a ratio of more than 5½ to 1.

While losses and repossessions continue to be somewhat greater than in normal years in relation to volume of business, collections have been satisfactory, according to Ittleson. The amount of repossessed products in the company's possession on June 30, 1932, at realizable values, was $148,480. This compares with $247,291 at the end of 1931.

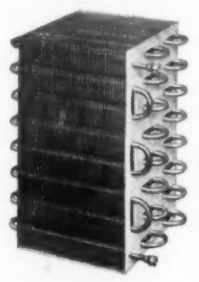
Net volume of bills and accounts purchased during the first half of the year amounted to $171,584,776, compared with $195,671,594 for the first six months of 1931. Despite the reduction in volume, the corporation was able to show net earnings in excess of dividends.

ILLINOIS REFRIGERATOR CO. PLANT SOLD BY REFEREE

MORRISON, Ill.—Plant No. 1 of the Illinois Refrigerator Co. was sold to the Rich Illinois Mfg. Co., which has been operating a toy department and refrigerator manufacturing business in the plant, according to word received from Philip H. Ward, referee in bankruptcy for Illinois Refrigerator Co.

Plant No. 2, according to Ward, will be leased or sold shortly, although no definite plan has yet been arrived at.

A NEW FIN COIL *by* PEERLESS



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Absolute Metal to Metal Contact.
A Superior Coil in which Soldered Return Bends have been eliminated.
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8-10-32

REQUESTS FOR INFORMATION

Please refer to the 1932 Refrigeration Directory and Market Data Book for a complete list of all manufacturers of refrigeration equipment, parts, materials, supplies and accessories; also for all available statistical data on sales of refrigeration equipment, distribution methods, etc.

To obtain a copy of this book send $2.00 to Business News Pub. Co., 550 Maccabees Bldg., Detroit, Mich.

Advertisers will be given preference in published answers to requests for buyer's guide service, but a complete list of all known suppliers will be mailed if stamped, self-addressed envelope is enclosed with inquiry.

Readers who can be of assistance in furnishing correct answers to inquiries, or who can supply additional information, are invited to address Electric Refrigeration News, mentioning query number.

Winter Ice Consumption

Query No. 893—"We shall appreciate it if you can tell us what percentage of ice customers takes ice during the fall and winter months. If at all possible, we would like to have this not only on a national average basis, but from representative parts of the country as well."

Answer—We have no figures on this subject, but suggest that you write to Leslie C. Smith, secretary, National Associates of Ice Industries, 163 West Washington St., Chicago.

Electric-Ice Parts

Query No. 894—"Can I buy parts for Electric-Ice rotary compressors? I can't get a vacuum on the gauge, which registers pressure all the time."

Answer—Perhaps you refer to the "ElectrIce" refrigerator, which was manufactured by the Belding-Hall Co., Belding, Mich. Any replacement parts or service information now available on this machine may be secured from the Gibson Refrigerator Co., Greenville, Mich.

Sales Figures, Lubrication

Query No. 895—"I should like to know the approximate total number of refrigerating machines built and sold during 1931, and in the first six months of 1932; also the approximate average quantity of lubricating oil required by the manufacturer for the initial fill placed in the unit at the factory."

Answer—Figures for sales during 1931 may be found in the 1932 REFRIGERATION DIRECTORY and MARKET DATA BOOK. As reported in the July 27 issue of ELECTRIC REFRIGERATION NEWS, a total of 519,462 household machines were shipped during the first six months of 1932 by the 10 companies comprising the Nema group, but no figures are available for the companies outside that group. We have no accurate method of estimating the average quantity of lubricating oil required by one electric refrigerator, but refer you to the June 29 specifications issue of ELECTRIC REFRIGERATION NEWS.

PRK-40 Russian Mineral Oil

Query No. 897—"Can you advise us where we can purchase PRK-40 Russian Mineral Oil?"

Foreign Agency

Query No. 899—"Our distributor in Morocco is interested in securing the agency for an electric refrigerator, and we should appreciate it very much if you will furnish us with a list of names which we may refer to our account. Your name was furnished us by the Department of Commerce, Bureau of Foreign & Domestic Commerce, Electrical Equipment Division."

Answer—Complete specifications of 49 makes of refrigerators are contained in the June 29 issue of ELECTRIC REFRIGERATION NEWS, which is being forwarded.

G. E. DISTRIBUTORS PLAN ACTIVE FALL CAMPAIGN

(Concluded from Page 2, Column 5)

N. Y.; P. L. Miles, Chicago; L. H. Miller, Louisville, Ky.; R. S. Montgomery, Richmond, Va.; C. F. Neave, New York City; J. E. Neily, Waterbury, Conn.

D. F. Newman, Schenectady, N. Y.; D. A. O'Bannon, Little Rock, Ark.; W. H. Ochiltree, Pittsburgh; N. K. Ovalle, Harrisburg, Pa.; Geo. Patterson, St. Petersburg, Fla.; H. A. Pendergraph, Nashville, Tenn.; J. R. Poteat, Chicago; T. K. Quinn, New York City.

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R. Stevenson, New York City; S. E. Stewart, Charleston, W. Va.; W. B. Stringham, Des Moines, Iowa; O. F. Stuefer, Minneapolis; T. J. Sullivan, New Orleans; B. K. Sweeney, Denver; G. F. Taubeneck, Detroit; W. L. Thompson, Boston; J. E. Vaughan, El Paso

J. M. Wicht, Bridgeport, Conn.; A. H. Willis, Akron, Ohio; D. H. Willis, Akron, Ohio; C. E. Wilson, Bridgeport, Conn.; F. W. Wolf, Buffalo; Mark Wright, San Antonio, Tex.; H. L. Wynegar, New York City; W. D. Yates, Bridgeport, Conn.

Nema Sales By States For June, 1932

STATES and Territories	Quantity of HOUSEHOLD Low Sides
Connecticut	2,198
Maine	699
Massachusetts	4,600
New Hampshire	473
Rhode Island	694
Vermont	274
New England Total	**8,938**
Delaware	267
Maryland and D. C.	4,291
New Jersey	6,064
New York (state)	33,966
Pennsylvania	10,375
Eastern Total	**54,963**
Kentucky	1,234
Ohio	5,802
West Virginia	982
East Central Total	**8,018**
Alabama	740
Florida	1,506
Georgia	1,234
North Carolina	797
South Carolina	444
Tennessee	874
Virginia	2,126
Southeastern Total	**7,721**
Illinois	13,650
Indiana	2,828
Michigan	4,004
Wisconsin	1,759
Great Lakes Total	**22,241**
Minnesota	2,183
North Dakota	199
South Dakota	157
North Central Total	**2,539**
Iowa	1,469
Kansas	892
Missouri	2,424
Nebraska	808
Middle West Total	**5,593**
Arizona	259
California	5,569
Nevada	87
Pacific Coast Total	**5,915**
Idaho	299
Montana	244
Oregon	1,008
Utah	525
Washington	1,144
Northwestern Total	**3,220**
Colorado	729
New Mexico	127
Wyoming	102
Rocky Mountain Total	**958**
Arkansas	338
Louisiana	677
Mississippi	250
Oklahoma	896
Texas	3,609
Southwestern Total	**5,770**
Total United States	**125,876**
Total Canada	**1,423**
Other Foreign (Incl. U. S. Possessions)	**3,027**
Total for World	**130,326**

Note—Commercial sales by states were incomplete.

GENERAL ELECTRIC PLANS SECOND ELECTION CONTEST

(Concluded from Page 1, Column 4)

in the remaining six districts; secretary of state, leading distributor in remaining five districts; secretary of treasury, leading distributor in remaining four districts; secretary of commerce, leading distributor in remaining three districts; secretary of health, leading distributor in remaining two districts; secretary of education, leading distributor in remaining district.

The Senate will consist of the leading merchandise manager of utility outlets in each of the 54 states (distributorships). The Congress will consist of the leading dealer in each state.

A state election slate will also be chosen. The governor of each of the states will be the leading sales manager in that state; the lieutenant governor will be the leading branch manager, district manager, or sales supervisor.

State senators will vary in number according to the territory covered by each particular state, but will be chosen from utility company division managers; state representatives will be chosen from utility company district managers.

All salesmen are eligible as candidates for the positions of mayor, sheriff, judges, etc.

Quotas will be assigned in dollars instead of units, as last year, for the campaign period, and every dollar's worth of Monitor Top refrigeration sold during this period will entitle the candidate to a fraction of a vote or more, depending on the size of his quota.

FADA NAMES DISTRIBUTORS

NEW YORK CITY—Two new distributors of Fada electric refrigerators and radios have been announced by Frank A D. Andrea, president of Fada Radio & Electric Corp. The companies are: The Gibson Co., Indianapolis, and Shadbolt & Boyd Co., Milwaukee.

THE CONDENSER

PAYMENT IN ADVANCE is required for advertising in this column. The following rates apply:

POSITIONS WANTED—Fifty words or less, one insertion $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each. ALL OTHER CLASSIFICATIONS—Fifty words or less, one insertion $3.00, additional words six cents each. Three insertions $8.00, additional words sixteen cents each.

REPLIES to advertisements with box numbers should be addressed to the box number in care of Electric Refrigeration News, 550 Maccabees Building, Detroit, Mich.

POSITIONS WANTED

AIR CONDITIONING SALES ENGINEER solicits correspondence with manufacturer with view of immediate or future employment. Technical and practical and with fourteen years intensive sales connections in direct and distributor dealer outlets, and marketing commercial refrigeration, ventilating and heating equipments, which combined are merged into modern air conditioning apparatus. Prefer connection with manufacturer as district representative to personally handle direct sales, and appoint and train distributor dealer outlets. Box 494.

REFRIGERATION Service Manager. 38 years of age. Married. 14 years of experience on commercial and domestic. Have also had charge of factory experimental and production depts. Have contacted distributors and dealers. Desire connection with factory, distributor or large dealer. Best of references as to ability and character. Box 495.

THOROUGHLY EXPERIENCED refrigeration man desires to make new connection with manufacturer, distributor or refrigeration specialty concern. Age forty years. Pioneer in automatic field. Two years production and development domestic machines. Four years national service manager. Ten years sales engineer, chief engineer and branch sales manager for one of most successful ammonia manufacturers in business. Experience with rotary and reciprocating machines, design, production, application and merchandising from household to largest commercial, all refrigerants, including air conditioning. Has large acquaintance with real producers in refrigeration field. Excellent references. Prefer connection with concern where opportunity presents itself, and remuneration based on results. Box 496.

SIX YEARS experience as Kelvinator domestic and commercial sales engineer. Dealer organization and wholesale. Experienced in organizing and training sales force, domestic and commercial applications, and general all around wholesale territory work. Utility contact. Excellent references. Acquainted in middle west territory. Desire connection with manufacturer or distributor of refrigeration or allied line. Box 497.

NEW PRODUCTS ENGINEER. Wish to develop a room cooler for manufacturer; have design idea that will result in low cost and great sales advantage. Have both the engineering and the business experience necessary to start and to conduct air conditioning department. Also have plan of simple motor driven humidifier for winter sales. Willing to arrange remuneration largely on percentage basis. Experience with two of largest companies in refrigeration industry. H. G. McComb, 2342 N. Kedzie Blvd., Chicago, Ill.

SERVICE TRAINING

HERKIMER Institute of Refrigeration, 1819 Broadway, New York, trains and supplies men for service exclusively, or combined service and sales. Clean cut men, selected for sales ability and trained for service will prove useful in both departments. Build a flexible, contented, permanent organization. Eliminate excessive personnel turnover. Special terms for group training. Write for detailed information.

KELVINATOR SALESMAN DROWNS IN FLOOD

AUSTIN, Tex.—J. W. Brunson, Kelvinator salesman, was one of many swept to their death by drowning in the recent floods in southwestern Texas.

Sales Opportunity

For a manufacturer having a low priced domestic electric refrigerator in the three popular sizes I can offer a marketing plan radically different that will produce real sales volume. I have been in refrigeration since 1925 and have covered the refrigeration market throughout the United States. Am now employed by one of the largest manufacturers in the field in an executive capacity and am well known in the industry.

Box 492
Electric Refrigeration News

SALESMAN WANTED

A large and well known manufacturer of Commercial refrigeration products has an opening for a seasoned salesman who has had a wide experience in opening distributor and dealer accounts. Applicant must be able to show successful record of accomplishment and have capacity to produce business in volume. To the right man, we will offer a salary and bonus based on volume. Address, in confidence,

Box 498
Electric Refrigeration News

Our employees know of this advertisement.

G. E. Distributors Go to Work on Fall Program

President Dunning and Cabinet

The worries of state seem not to have bowed the heads of the cabinet of Refrigerania. Front row: C. L. McCrea, Washington, D. C.; Arthur Dunning, president, Duluth, Minn.; A. F. Head, Indianapolis. Back row, George Belsey, Los Angeles; Mark Wright, San Antonio, Tex.; Philip Harrison, Newark; K. A. Connolly, Billings, Mont.

Visualizer Finalists

Junius R. Tribe (front row, center) of Ogden, Utah, won the finals of the salesmen's visualizer contest, with A. Y. Tucker, New York City, to his left, second, and H. A. Gangwer, Knoxville, Tenn., to his right, third. Other finalists (back row): H. C. Ward, Cleveland; Don McBride, Sacramento, Calif.; W. J. Botterill, Baltimore; F. C. Clinton, Detroit.

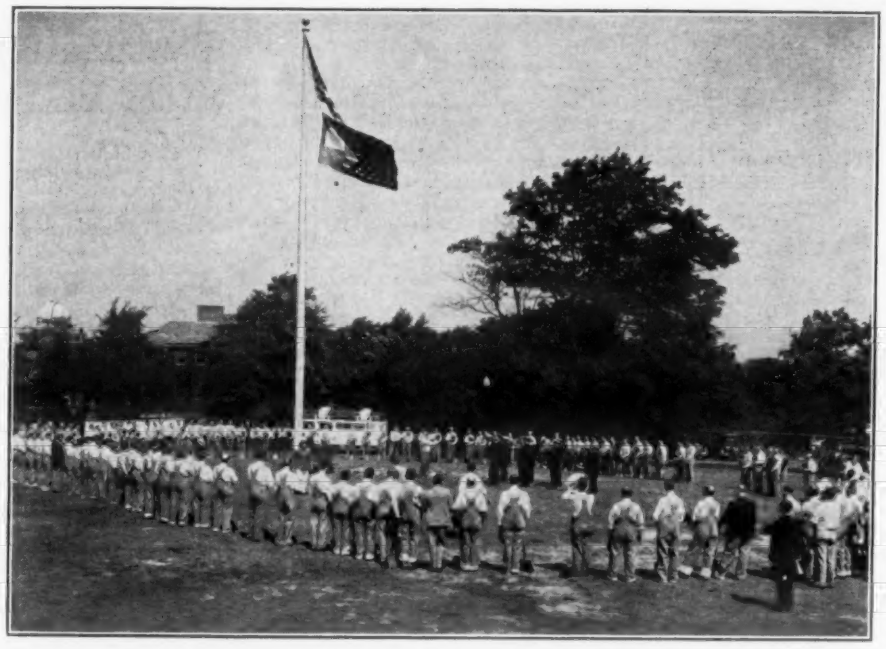
General McCrea and Aides

Generalissimo C. L. McCrea of the Armies of Refrigerania and his staff members, winner of the recent "war" campaign, discuss tactics in preparation for another sales "war." Front row: Wayne Merriam, Albany; McCrea; A. J. Finck, Omaha. Back row: Syd Caswell, Detroit; A. F. Head, Indianapolis; H. H. Courtright, Fresno, Calif.; S. C. Griswold, Dallas, Tex.

Digging for Gold

Art Dunning of Duluth and Phil Harrison of Newark show how they shovel order after order toward the G. E. headquarters in Cleveland.

All Hail Refrigerania



As the flags go up, the "working men" of Refrigerania doff their caps in salute. This ceremony followed the parade which opened Camp Refrigeration VI, at Nela Park, Cleveland, annual August meeting of General Electric refrigerator distributors.

Ted Quinn on Hand

In which Chuck Gentsch, distributor at Boston, and Ted Quinn, G. E. vice president, gaze into the sun at the worker's parade.

General Electric Distributors Start 'Back to Soil' Movement

Congressman "Doc" Eaton's talks always send G. E. conventions off to a good start.

Charles Gould, Portland, Me., and F. H. Cushman, Cleveland, ready for a hard days' work.

President Art Dunning, the people's choice, will fight for reelection this year.

Generalissimo C. L. McCrea is not averse to putting on his work clothes.

Chuck Gentsch, Dorsey Hines, M. A. Glueck borrow a truck to add reality to their workingmen's costumes.

Mark Wright looks over the ammunition, in preparation for hard work.

AIR-CONDITIONING ISSUE

Engineering Section

IN TWO PARTS PART TWO

ELECTRIC REFRIGERATION NEWS

Registered U. S. Patent Office

The business newspaper of the refrigeration industry

VOL. 6, NO. 49, SERIAL NO. 177

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DETROIT, MICHIGAN, AUGUST 10, 1932

Entered as second-class matter Aug. 1, 1927, at Detroit, Mich.

THREE DOLLARS PER YEAR

SERVEL DESIGNS TWO MODELS OF AIR CONDITIONERS

Heating, Humidification Optional in New Cabinets

EVANSVILLE, Ind.—Servel engineers have just announced a new comfort cooling cabinet for offices, homes, restaurants and retail establishments.

The unit draws air in from the room, passes it through chilled coils, and forces it out with a slow-speed propeller fan.

The cabinet has an external removable cover, a metal inclosure, walnut grain finish, baked enamel under coat, and a steel grille top. The cabinet conceals all fittings and connections and is provided with access doors at each end.

When in existing buildings, it is desired to take in fresh air from a window opening, a fresh-air intake may be provided to connect with this source of outside air.

The internal cabinet is constructed of 16-gauge galvanized steel completely painted. At the base is a filter and connection for fresh air. A damper permits control of the amount of outside air admitted. All pipe connections are made externally at each end of the inner cabinet and are totally enclosed by the outer cabinet.

The fans are silent multi-blade forward curved type made entirely of aluminum and hung on a double-shaft extension of the fan motor. Scrolls are of heavy construction with special cut-off for quiet operation.

The cooling coils are constructed of finned copper tubing, arranged with three parallel rows of six passes, each joined to forged brass headers using "stream line" joints.

Heating coils are provided in one of the two types of comfort-cooling unit and are of non-ferrous structure throughout, with copper tubes, aluminum fins and brass headers.

The drip pan, or humidifying pan, is of 16-gauge galvanized steel, copper lined and insulated on the bottom with ½ inch of cork. It is provided with an adjustable overflow to regulate the amount of humidification in the winter.

The unit provided with the heating and cooling coils is equipped with a spray humidifying apparatus, while the unit wth only the cooling coil does not have any humidifying equipment.

Overall dimensions of both units are the same: 12⅝ in. wide, 43¼ in. long, and 24 in. high.

NEW VENTILATING FAN ANNOUNCED BY ROSS

DETROIT—The Motovent, an electric ventilating fan for installation in the walls or window openings of any home, has just been introduced in five sizes by Fred'k. N. Ross, Inc.

Motovents, four models of which are constructed of chromium-plated parts and polished aluminum castings, the other being finished in gray enamel with cadmium-plated trim, are designed to make a complete change of air in any room in four minutes.

Installation of the Motovent in window openings is made by screwing two brackets to either the top or bottom of the window sill in any room, and then slip-locking the fan into these brackets. Telescoping plate glass on either side of the fan closes the openings between the fan and the sides of the window space.

Model 400 Motovent is designed for window installation, has an air output of 450 cu. ft. per minute, will fit any window from 24 in. to 34 in. in width, and has an 8½-in. fan. It is priced at $37.50.

Model 600 Motovent is also intended

(Concluded on Page 5,Column 3)

SEA FOOD GROTTO INSTALLS COMFORT COOLING

CHICAGO—A Korectaire room cooler has been installed in the Rainbo Sea Food Grotto, 117 South Dearborn St., by the Korectaire Sales Co. of Chicago. The unit uses 800 lbs. of ice per day.

The equipment is manufactured by the Watts Mfg. Co. of Sterling, Ill.

Features of this Section . . .

Air conditioning, comfort cooling, and its attendant problems of estimation, installation, design, selection of suitable parts of a system, etc. are described in this section of the News by a selection of articles and reports containing much valuable information.

You are particularly referred to the following features:

Methods of estimating the requirements of typical installations as devised by G. C. Polk (page 10), chief engineer of the American Blower Co., and by William Higham (page 11), air-conditioning engineer of the Universal Cooler Corp.

Descriptions of residential air-conditioning installations typifying modern practices, as presented on page 2, and elsewhere in the section.

A treatise on the fundamental principles of comfort cooling (page 6) by George B. Bright, Detroit consulting engineer, in which a clear distinction is made between "comfort cooling" and "air conditioning." Mr. Bright also tells how to use the psychrometric chart and the comfort zone.

Descriptions and circuit diagrams of electrical controls developed by the Detroit Lubricator Co. especially for air-conditioning equipment are presented by D. D. Wile on pages 14 and 15.

Performance tests of comfort coolers using ice appear on page 4 (developments of George Bright), and on page 13 (tests of the Carrier portable room cooler). Current research in the field of air conditioning is reported on page 9.

Page 8 describes a number of component parts and materials that various manufacturers have developed especially for air conditioning. The back page of this section portrays with pictures a number of interesting applications of comfort-cooling equipment.

Bright Designs New Comfort Cooler For Ice

By John T. Schaefer

DETROIT—George Bright and his associate engineers have developed a portable ice room cooler for the Ohio Galvanizing & Mfg. Co., Niles, Ohio, which is to be placed on the market early next year by the latter concern. The cooler will probably be sold for less than $100, and will bear the trade name of "Komforte Koolaire."

When the writer visited the Bright laboratories on July 22, one of the room coolers was operating in Mr. Bright's 16x16-ft. private office to keep comfortable air conditions in spite of high outdoor temperatures. The performance record for that day is charted on page 4 of this issue.

A number of Mr. Bright's ideas on comfort cooling have been incorporated in the new cooler. First, he believes that it is uneconomical to attempt to cool all the air in a room, but that air cooling should be confined to air in the lower strata in which persons work. So the Komforte Koolaire projects cooled air out of the side of the cabinet at an angle of about 30° from horizontal, allowing the cool air to settle gently over the heads of room occupants.

Another feature of the unit is the

(Concluded on Page 4, Column 3)

Turning Out Frigidaire Air Conditioners

Activity in the Frigidaire plant as a batch of horizontal models go down the production line.

AVIATORS' FUR SUITS COOLED BY COPELAND

MT. CLEMENS, Mich.—Fur-lined suits of Selfridge Field flyers are now kept in a Copeland refrigerated cold storage room, just constructed at the army flying field, here.

The storage room is 20 ft. long, 12 ft. wide, and 9 ft. high, inside dimensions. A Copeland model T, 2-hp. water-cooled condensing unit, and a large special forced convection type cooling unit keep the room at 26° F.

The condensing unit is mounted on a specially constructed base consisting of a concrete superstructure with cork insulation and a wood top. A feature of the installation is the elaborate instrument panel which consists of an enclosed fuse switch, relay starter, hand switch, pressure control, electric liquid control valves, special alarm control and bell, high and low pressure gauges, and outlet water thermometer.

ALCO DEVELOPING VALVES FOR F-12 AND METHYL

ST. LOUIS—Engineers of the Alco Valve Co. here, are designing a new thermostatic expansion valve for air-cooling service with F-12, methyl chloride, and sulphur dioxide refrigerants. Previously Alco valves have been used only with ammonia.

Campbell Incorporates Noise Elimination In Conditioner

NEW YORK CITY—Equipment which embodies not only the six usual elements of air conditioning, but eliminates noise from the rooms in which it is installed, is now being manufactured by the Campbell Metal Window Corp. here.

Noise elimination is secured by keeping all windows closed, and by bringing the air for ventilation through a labyrinth which is worked out on the principle of the Maxim gun silencer. In locations where the noise is of unusual intensity, secondary Compbell sound-proof windows are installed.

The various models of Maxim silencers and Campbell air conditioners supply fresh air to the room at the rate of 300 cu. ft. per minute by means of a motor and fan which draw the air from outdoors. A fan motor rheostat con-

(Concluded on Page 5, Column 2)

DOUGLAS MFG. CO. ANNOUNCES NEW TERMINAL BOX

BRONSON, Mich.—A new type of terminal box for electric refrigerator motors has just been announced by the H. A. Douglas Mfg. Co. here. The box is designed to eliminate knock-outs, wire clamping devices, as well as soldering and taping of joints.

F-12 OPPONENTS ISSUE BOOK OF ARGUMENTS

NEW YORK CITY—Opponents of F-12 and its exemption from municipal regulations governing the use of other refrigerants, have just issued a 374-page cardboard-bound book summarizing much of the evidence and arguments presented on both sides of the controversy. Prepared by E. T. Williams, consulting engineer for Servel, Inc., and John Kenlon, New York engineer, the book comprises information presented before the Board of Hazardous Trades of the New York City Fire Department.

The volume contains the main brief of the manufacturers of F-12 and its rebuttal memorandum, published on left-hand pages throughout, while William's and Kenlon's paragraph-by-paragraph dissection and analysis appears on right-hand pages.

FRIGIDAIRE WILL CONDITION BROADWAY RESTAURANT

DAYTON—Receipt of a contract for complete air conditioning of the Hollywood restaurant, 42nd and Broadway, New York City, was announced last week by J. C. Chambers, manager, air-conditioning division, Frigidaire Corp.

Thirty-six large coils and twelve compressors will be used. The Hollywood is one of New York's supper clubs.

FRIGIDAIRE USES 2 REFRIGERANTS IN NEW COOLERS

Instantaneous Cooling Of Water Done By Secondary Gas

DAYTON—Through use of a secondary refrigerant in the cooling of drinking water and beverages, Frigidaire engineers have speeded up the heat-removal process to a point where the cooling operation is almost instantaneous, according to E. B. Newill, vice president in charge of engineering, Frigidaire Corp.

The primary refrigerant is used in the direct expansion evaporator of each cooler and in the condensing unit connected to it. The secondary refrigerant is confined to the inner tank of the cooler proper and acts as a heat transfer between the water coil and the primary evaporator.

When the system is started, the liquid to be cooled moves through a coil which is immersed in the secondary refrigerant. The heat of the warm liquid causes the secondary refrigerant to boil. The rising vapor strikes the coils containing the primary refrigerant, is condensed into a liquid, and drops back to be used over again.

"By removing the circulating water coils from direct contact with the primary refrigerant, we have been able to overcome the usual difficulties which arise in the event of a leak and the introduction of moisture into the refrigerant lines," said Newill.

"At the same time we get the rapidity of cooling that would be achieved by putting the water coils into direct contact with the primary refrigerant. In the event of a possible freeze-up the worst that could happen would be the loss of the secondary refrigerant."

The double refrigerant principle received its first test in soda fountains. In such installations two coils are provided, one of block tin for carbonated

(Concluded on Page 5, Column 1)

MOTOR LINE REVISED BY WESTINGHOUSE

EAST PITTSBURGH, Pa.—Westinghouse Electric & Manufacturing Co. has developed a complete new line of fractional horsepower motors.

The announcement, made by O. F. Stroman, manager, Westinghouse industrial department, tells of the development of a new type of capacitor motor and the redesign of the older types of other small motors.

A new degree of interchangeability has been achieved in the new Westinghouse designs. Frames, shafts, bearings and mounting arrangements are interchangeable, rating for rating. Five frame sizes suffice to serve the entire line, ranging in output from 1/30 to ¾ hp., whereas more than a hundred frame sizes were formerly required.

All types of small motors are affected by the redesign. Split-phase, capacitor, repulsion-induction, polyphase, direct-current and repulsion motors will comprise the new line.

First of the new line to be put into production is the refrigerator capacitor type motor. Production on the other types of motors will be started as soon as change-overs in shop equipment are completed.

A feature of the new motors is an improved type of resilient spring mounting which reduces the vibration inherent in 60-cycle a. c. motors.

The development was carried on at the East Springfield (Mass.) works of the Westinghouse company, under the direction of R. Ehrenfeld and C. R. Boothby, manager and development engineer, respectively, of the small motor engineering department.

ILLINOIS FIRM INTRODUCES NEW ICE ROOM COOLER

BLUE ISLAND, Ill.—Using ice as a refrigerant, a Wepsco RotoCold for cooling, dehumidifying and circulating room air, has been placed on the market by The Wepsco Steel Products Co. here. The cooler is available in three sizes.

Public Acceptance of Commercial Air Conditioning Opens Home Market

By Engineers of the York Ice Machinery Corp., York, Pa.

GENERAL public acceptance of air conditioning and comfort cooling within the last few years—brought about by the rapidly increasing number of theatres, stores, offices, and public buildings offering comfort to their patrons as an aid to business—has opened a vast market for such equipment in the home or domestic field. A careful study of the various conditions to be met in designing suitable equipment for residences, clearly shows that no single design or application will fit all cases or classes of homes without some rearrangement or adaptation.

Yet, in order to reach this vast potential market, equipment must be offered in such form as to permit standardization and mass production in order to bring the initial cost and cost of operation, within the reach of the average home owner.

Much progress has been made in this direction and like other new developments it is reasonable to expect constant changes and improvements in design of air-conditioning equipment for homes, individual offices and small stores and restaurants.

However, the basic principles will remain the same and any changes will mean more compact design, and improvement in physical appearances.

The systems described below represent actual installations which have been made and have been in operation for the past year. They cover the different conditions arising from the specific application—they represent sound engineering as verified by the owners, satisfaction with their performance under extreme weather conditions prevailing during the past few weeks.

From observations and tests on a number of these refrigeration installations, it has been clearly demonstrated that air conditioning and comfort cooling for the home are past the experimental stage, out of the laboratory, and ready for the consumers' demand.

Installation No. 1

A comfort-cooling system was installed in an eight-room house with steam heating system, to provide summer comfort in any two rooms.

In the living room and sun parlor the conditioned air is brought in through a grille on the floor, directly in front of the radiator, and returned through a floor grille at the opposite end of the room. The same arrangement is used in the bedrooms.

The system is designed for the cooling of any combination of two rooms by a simple hand adjustment at the grilles. With this arrangement an average-sized house may be completely conditioned at a minimum cost by designing the refrigeration and air distribution system to take care of a portion of the space at one time.

Refrigeration Equipment

The refrigerating equipment and cooling unit are located in the basement, as is the necessary ductwork for air distribution to the rooms on the first floor. The distributing ducts leading to the second floor are concealed behind the built-in bookcases in the living room.

The refrigeration side of the installation consists of a 2½-ton York Freon compressor connected by V-belt drive to a 3-hp. motor, and an air-cooled condenser—housed in the furnace room. This equipment is mounted on a sound- and vibration-proof foundation which prevents noise being transmitted to the rooms directly overhead.

The cooling unit is of vertical-fin surface type with fan housing enclosed, and is located in the adjoining space. This compact cooling unit is 5 ft. high by 2 ft., 9 in. wide and 8 in. deep, designed for direct expansion of the refrigerant. The fan, driven by a ½-hp. motor, circulates 1,100 cu. ft. of air per minute to the conditioned spaces, providing a 6-minute air change which has been found most satisfactory for residential work.

The Controls

A temperature of 80° F. dry bulb and 50 per cent relative humidity may be automatically maintained in the rooms under extreme outside weather conditions. Sufficient reserve capacity is provided so that even lower temperatures may be carried to suit the individual demands.

A thermostat in the return duct, set at a predetermined temperature, automatically starts or stops the compressor with any variation in load. An electric push button station located on the first floor will start or stop the entire system including the circulating fan on the cooling unit.

Air Distribution System

By injecting the air into the room at comparatively high velocity through the floor grilles (yet preventing air noise), and exhausting the air at the opposite end of the room, it has been found that an even temperature is maintained in the room without any objectionable draft. Under actual demonstration the room may be held within 1° plus or minus of the predetermined temperature.

Installation No. 2

Another air-conditioning system designed for year-round operation, provides summer cooling, as well as winter heating and humidification. The system includes a refrigerating machine, hot air furnace, spray chamber, and filter section—with forced-air circulation.

This particular size represents a 4-ton York self-contained Freon compressor, coal-fired furnace, and conditioning chamber containing atomizing spray nozzles for winter humidification, fin surface cooling coils for summer cooling and air filters for removing dust and dirt. This system will condition an average eight-room house.

Other systems of similar design are made in sizes from ⅓ to 20 tons capacity for any size residence. The conditioning chamber and refrigeration side are also available for adaptation to existing hot-air furnace installations.

The operation of this system is much the same as the one previously described, with the addition of winter humidification. Filtration and further washing of the air are secured by playing sprays against spun glass V-type filters having 1/16-in. water gauge pressure. The filters are self-cleaning. The plant has a 90-per cent dust, odor, and bacteria elimination.

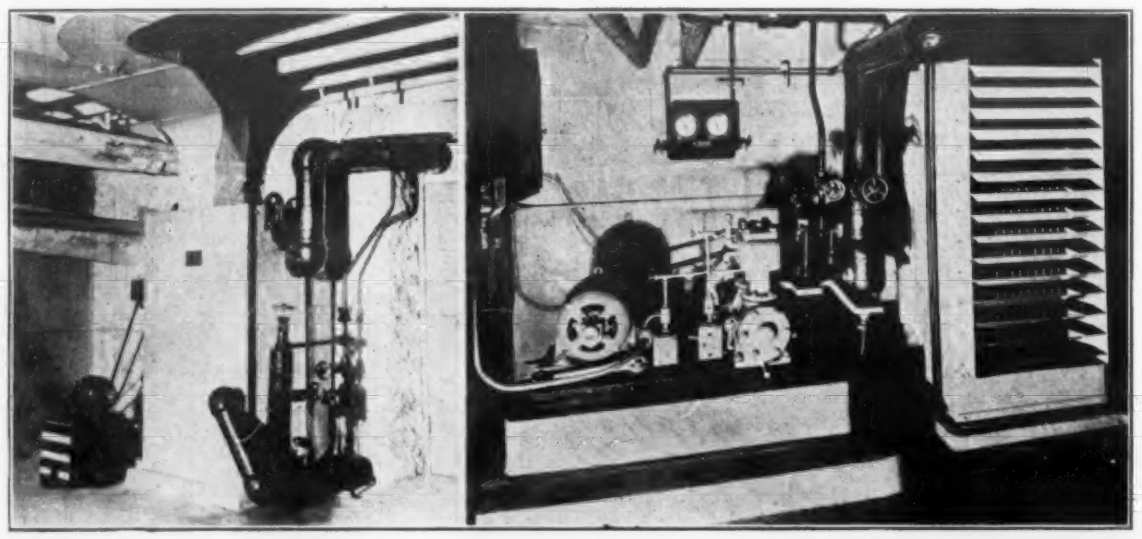
In winter, air on the entire lower floor will be washed, filtered, and humidified. Humidity will be regulated by a Somers humidistat, which operates on a one-plus or minus percentage of relative humidity.

The plant is of the central type, made of 40-oz. copper, and insulated on the outside. The system takes air from the dining room, conditions it, and returns it to the living room and hall.

A two-ton Copeland compressor supplies refrigeration for summer cooling. Cooling units are so installed that either the entire main floor, or the living room alone, may be cooled. The temperature is controlled by a thermostat, making the cooling operation intermittent. The power fan is of the centrifugal type.

Complete changes of air are effected five times per hour in winter and six times per hour in summer.

Residential Air-Conditioning Equipment



Left: York vertical type, fin surface air-cooling unit in the basement, adjoining the furnace room (right) which contains a 2½-ton Freon compressor and air-cooled condenser. See description above.

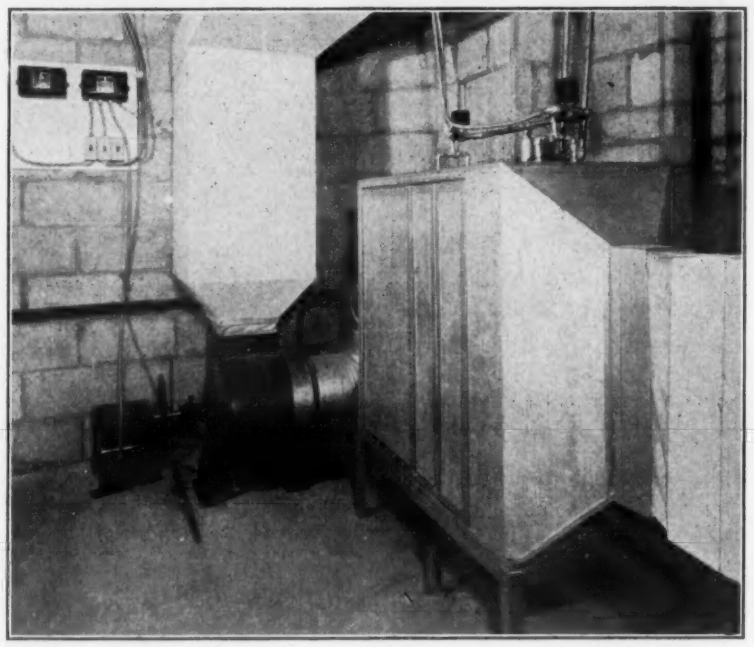
COPELAND PRESIDENT AIR CONDITIONS HOME

BIRMINGHAM, Mich. — Equipment for cooling, filtering, washing, humidifying, and dehumidifying the air has been installed in the home of Louis Ruthenburg, president of the Copeland Products Corp. The installation was made by H. J. Somers, Inc., of Detroit.

Washing and dehumidification of the air are accomplished by sprays applied to the cooling coil, supplying 141 sq. ft. of moist surface over which the air passes.

• • •

In Mr. Ruthenburg's Basement



Central air-conditioning system installed in the home of Louis Ruthenburg, Copeland president. It uses a two-ton Copeland condensing unit.

• • •

Current Problem Is Installation of Systems in Existing Buildings

By S. M. Anderson
Engineer, Air Conditioning Dept., B. F. Sturtevant Co.

ONE of the big problems underlying the discussion on air conditioning these days involves the question of how and where to get apparatus which will fit into existing buildings without expensive and often very inconvenient changes in the building structure. For example, many buildings requiring air conditioning are not equipped with ventilating systems having duct work leading to and from rooms which are to be conditioned.

Such a building would either have to be fitted out with such duct work or equipped with separate units and piping run from a central cooling plant to each unit to provide the necessary refrigeration. Other buildings may be adequately equipped with duct facilities, but on account of sprinkler systems located at the ceiling it would be impossible to extend the duct work to provide distribution of air in the conventional manner.

Again, we find buildings with adequate duct work and ventilating equipment and proper distributing duct work with very little space in the basement for the addition of the necessary cooling apparatus.

Accordingly, there has been developed apparatus for all these conditions, and for other conditions not mentioned which are continually developing as air-conditioning practice in equipping of large buildings, small offices, homes, and retail stores.

Considering first the store already equipped with adequate ventilating duct work for the proper distribution of air, which would require only a revision of the ventilating system to convert it into a cooling system, there is the compact "sectional bookcase" type of air washing, filtering, and cooling unit known as the Filticooler, illustrated in Fig. 1.

Store Cooler

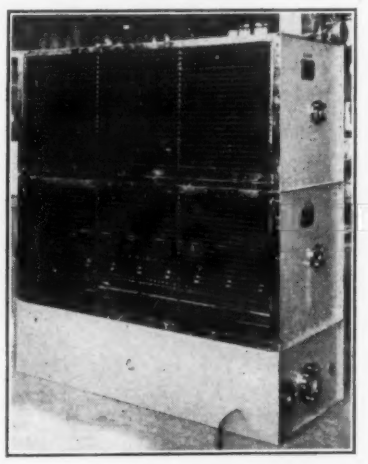


Fig. 1—Sectional type Filticooler.

This unit may be inserted in a ventilating duct system by simply removing 28 in. from the connection between the fan and the return ducts and inserting the proper size of unit built up to the proper height. The flanges shown in the illustration come already punched with holes on proper spacings for attachment to duct work.

Inside the unit is a set of spray nozzles and two filters. The spray nozzles when supplied with chilled water at approximately 40 to 50° F. will cool the air passing through the unit as much as was previously done by apparatus 7 and 9 ft. in length.

Inasmuch as piping costs are not particularly high, it is possible to locate the refrigerating apparatus at any convenient point and pipe the cold water to the Filticooler. Filticoolers in various sizes have been used for every application from household cooling installations to the cooling of large theatres.

Fig. 2 illustrates a Filticooler built into a unit form for the conditioning of an industrial process room. In this case the water is piped to the unit and the air distributed directly into the room, controlled by the setting of horizontal louvres to give adequate distribution. A propeller fan on the back of the unit, not shown in the photograph, creates the air circulation, changing the air in the room approximately once every five or six minutes.

For buildings which are not equipped with ventilating systems, it is often more convenient and advisable to put a series of propeller fan units in the various rooms to be conditioned, and use in place of the washer or Filticooler a set of cooling coils locating the refrigerating equipment either in the room or in some central location elsewhere, and expanding the refrigerant directly into the cooling coils.

The propeller fan blowing the room air over the cooling coils cools it and dehumidifies it under automatic or manual control, depending upon the completeness of the installation.

The Sturtevant Speed Heater Cooler, as its name implies, is used for both heating and cooling purposes, and has two sets of coils in it through one of which the refrigerant may be expanded directly, the other for use with steam.

For Factory Use

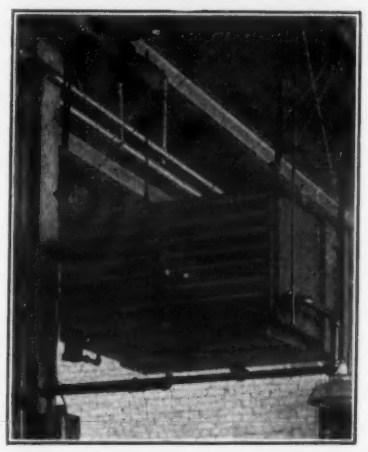


Fig. 2—For industrial air cooling.

It has vertical eliminators and horizontal deflecting louvres. The eliminators are for the purpose of removing all drops of entrained moisture condensed from the air, and also for diffusing the air evenly in both directions as it leaves the unit.

The horizontal louvres may be set independently to adjust the blast of air from the unit, so that it follows along the ceiling and diffuses gently with the room air as it gradually falls to the floor, producing the necessary cooling without the discomfort of drafts.

Often it is necessary to install a number of Speed Heater Coolers in a large room, so that they will work in conjunction with one another for an even distribution of air. This is a very feasible proposition, which has been done many times during the past few years in drug stores, dress shops, and other places of commercial activity.

Home Cabinet

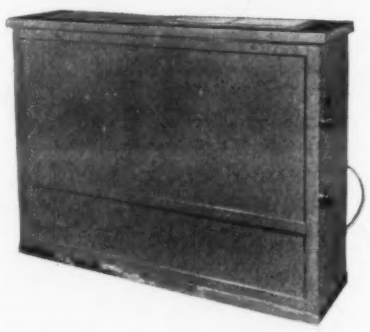


Fig. 3—Unit for homes and offices.

For the home and for the executive office, where quietness of operation is required, and where duct systems are not available, the unit ventilator-heater-cooler, Fig. 3, has been developed, having all the characteristics of the Speed Heater Cooler but having additional refinements to produce adequate circulation of air with quietness of operation.

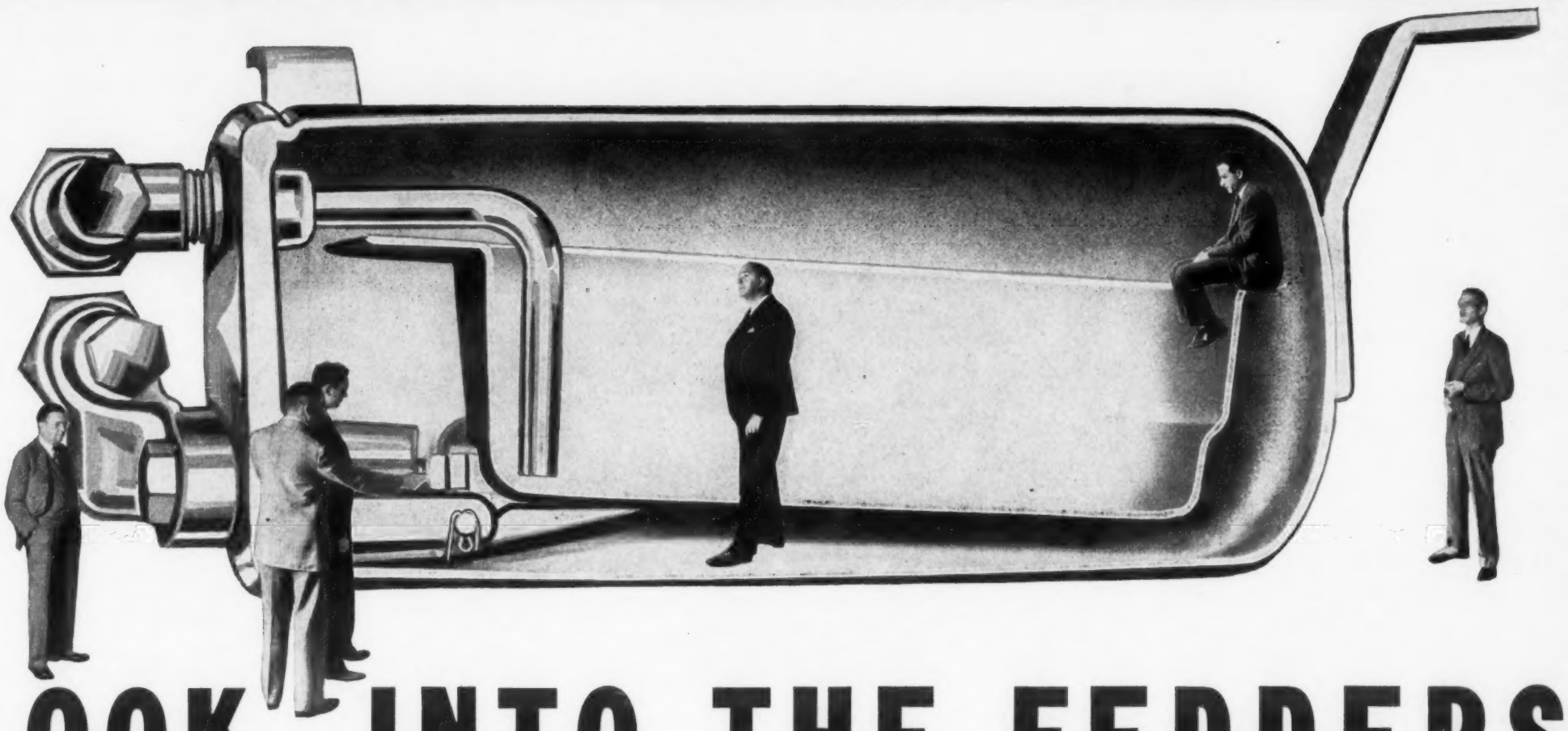
Such units may be located in a room at the point where radiators are found by simply removing the radiator and connecting the heating pipe to the unit coil, and adding a cooling piping system to the cooling coil from the compressor or other refrigerating apparatus located elsewhere.

The illustration shows two hand-operated dampers for regulating the amount of air passing through the cooling coil and around it. These dampers may also be under automatic control and provide a temperature mixture of cool air discharging from the unit in a generally upward direction in such a manner that it will not produce drafts upon anyone sitting near the unit.

In household work, in order to simplify and reduce the initial cost of installation it has been found feasible to locate units in certain parts of the house such as the dining room, living room, and two bedrooms, connecting the units to the refrigerating system in the basement, in such a fashion that cooling may be obtained in either the dining room and living room or both bedrooms.

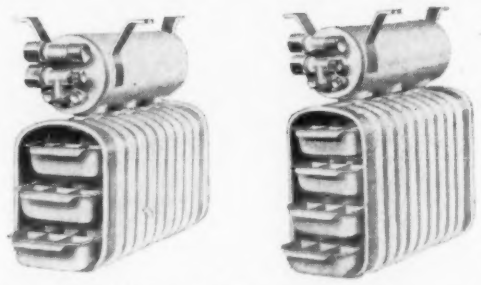
A system so operated makes it possible to cool four rooms in groups of two at a time by using half the refrigeration equipment, and at the same time permitting individuals living in the house to have all the cooling they wish on the first floor while they are living there, and when it is time to retire to switch the cooling to the upper floor for comfort, allowing the first floor to remain uncooled until the next morning.

ELIMINATE SERVICE COSTS!

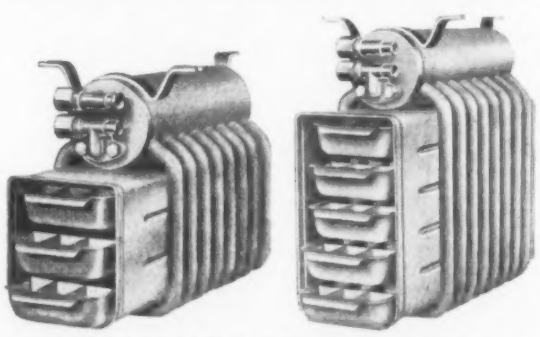


LOOK INTO THE FEDDERS BUCKET FLOAT ASSEMBLY

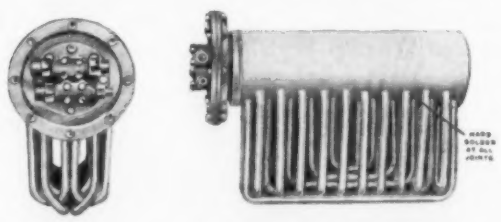
A Complete Line of Fedders Flooded Cooling Units for Every Domestic and Commercial Need



Fedders Prestalloy Flooded Type Domestic Cooling Units made of Brass and Copper throughout with Fedders Silver Satin Finish



Fedders Flooded Tube Cooling Units with Bucket Float



One of the many Cooling Units for Soda Fountains and Ice Cream Cabinets

SINGLE SECTION cross Fin unit with cylinder mounted lengthwise and equipped with cabinet flange

An Exclusive Fedders Engineering Feature Which Assures Positive Control of Refrigerant and Oil in Flooded Systems

FIELD SERVICE costs not only thousands of dollars but thousands of SALES. Manufacturers and dealers must depend on equipment that keeps on performing year in and year out *without profit-eating* service costs. Fedders low side control *eliminates* these three major sources of excessive servicing:

1. **Oil-starved compressors.**
2. **Inadequate refrigerant control.**
3. **Inaccessibility of moving parts.**

The Fedders Bucket Float Assembly returns, every 24 hours, many times the amount of oil which the compressor crankcase holds. Adequate lubrication is "life insurance" to the compressor!

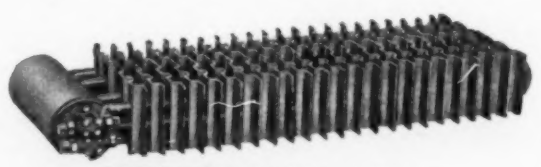
Thousands of Fedders Bucket Float Flooded Type Cooling Units in operation under all conditions of domestic and commercial installations are giving years of proof that they provide *perfect refrigerant control.* Under high atmospheric temperatures, such as experienced in warm climates where refrigeration is of vital importance, Fedders Flooded Type Cooling Units maintain a colder and more uniform temperature, and faster ice freezing than other type systems.

Fedders Flooded Type Units are not sensitive to variations in barometric pressure. They eliminate all necessity for any readjustment in locations where altitudes are unusually high or low.

The complete operation of the Fedders Bucket Float Assembly is illustrated and described in a bulletin which we will gladly send on request.

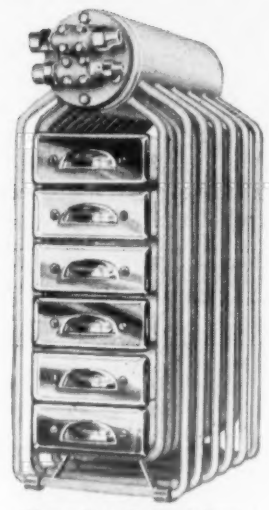
FEDDERS MANUFACTURING CO.

Specialists in Heat Transfer Devices 57 Tonawanda St., Buffalo, N. Y.

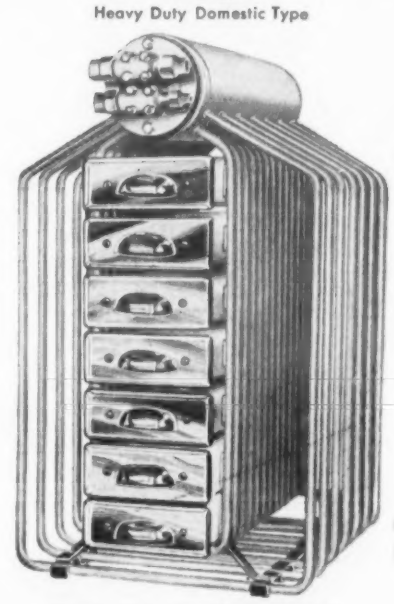


DOUBLE SECTION eight tube cooling unit with cylinder mounted crosswise

TRIPLE SECTION twelve tube unit showing how completely Fedders answers every requirement of space and capacity. All units made in a wide choice of lengths



Heavy Duty Domestic Type



Another Heavy Duty Flooded Model

FEDDERS MANUFACTURING CO.
Dept. N-811. 57 Tonawanda St., Buffalo, N. Y.
Kindly send me copies of your bulletins on:
☐ Domestic Cooling Units ☐ Commercial Evaporators ☐ Expansion Valves

Name _____

Firm _____

Address _____

NOTE: Territories open for reliable Sales Representation. ☐ Check if interested.

COROZONE ICE COOLER HAS OZONE FEATURE

CLEVELAND—The Corozone Co. here is now manufacturing the DeLuxe Aquazone air conditioner, a feature of which is a device for washing the air by forcing it through two revolving 16-in. wheels of mesh wire, over which flows a constant supply of cold water from eight curved dippers on the rim of each wheel. The wheels are driven by fan pressure.

The equipment washes, refrigerates, circulates, dehumidifies or humidifies, and deodorizes the air in a room.

Units operated on a. c. current are equipped with a device for deodorizing and "revitalizing" the air by producing ozone over a Corona spark, the ozone then being passed with the air through the refrigeration zone. Units operating on d. c. current may be equipped with this device at additional cost.

Its manufacturers say that the unit will create air movement seven feet from the floor, and thus form a cool, purified air zone by forcing the hot air to high levels.

STANDARD ENGINEERING CO. OFFERS TWO COOLERS

ST. LOUIS—Designed to filter, cool, dehumidify, circulate, and purify the air, two portable Kool-A-Room units are being produced by the Standard Engineering Works here.

The larger of the two units, selling for $195.50 has a capacity of 300 lbs. of ice, and conditions air in rooms up to 20x16x9 ft. in size.

Both coolers are iced from the top. Cabinets for the large unit are of lacquered steel, and those for the smaller unit are of walnut-finished wood.

Comfort Coolers Using Ice

Because of the widespread interest among electric refrigeration distributors in comfort cooling with ice, that method of cooling air for human comfort is reported in some detail on this page, and elsewhere in this issue of the News.

KOOLAIR-MAKER SUPPLIES 150- AND 300-LB. COOLERS

ST. LOUIS—Two portable ice coolers are being manufactured by the Koolair-Maker Corp. here, one with a capacity of 300 lbs. of ice, the other with a 150-lb. capacity. The units will cool, dehumidify, and circulate the air.

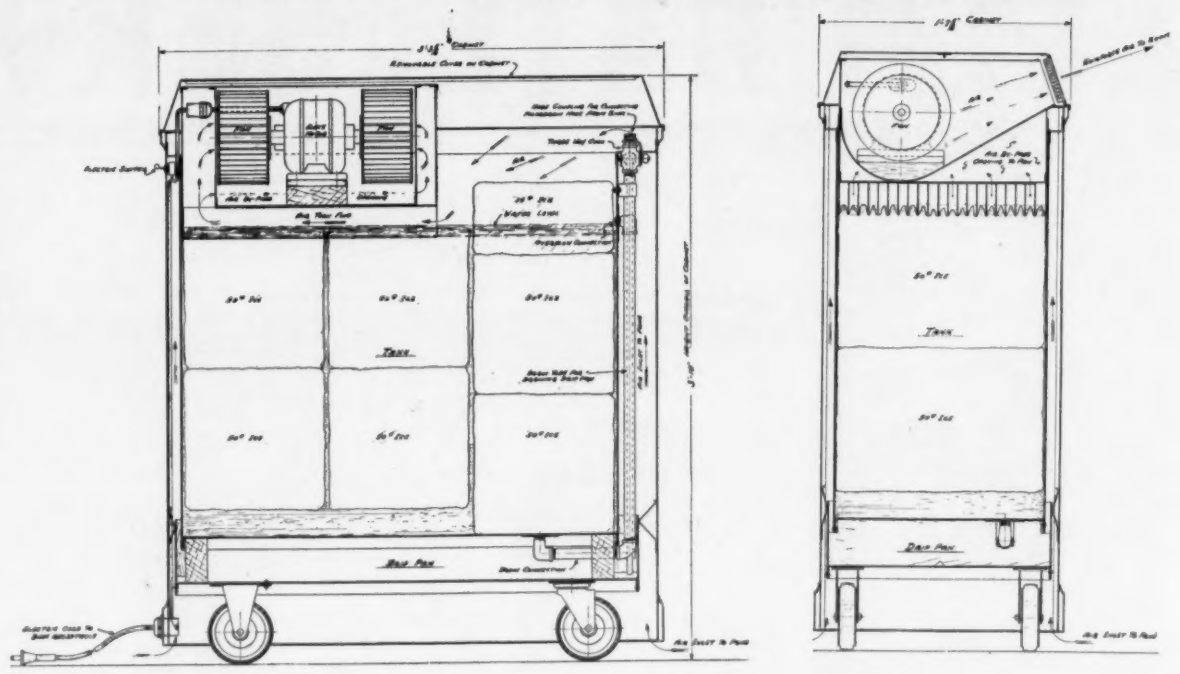
The larger of the two models is available in three types—that using the dry system of air cooling, by which air is passed over a radiator through which ice water is pumped; that employing the wet system, by which the air is cooled by passing it through a spray of ice water; and the type with both systems.

The smaller unit delivers 150 cu. ft. of cool air per minute, and is 17 in. wide, 17 in. deep, and 48 in. high. One charge of ice (150 lbs.) will last six to eight hours, according to the manufacturer.

MILLER SELLING CALCIUM IN NEW YORK

NEW YORK CITY—Arthur P. Miller, formerly with the A. P. Miller Supply Co., Inc., who recently went into business as A. & H. Miller, Inc., is now sales distributor for Wyandotte brand 77-80 per cent crystal calcium chloride.

Side and End Sections of the Komforte Koolaire



Komforte Koolaire To Be Marketed Next Year

(Concluded from Page 1, Column 4)

novel method of effecting heat exchange from air to the ice. Room air enters through the bottom of the cabinet, flows up between the steel outer liner and the ice can, is pulled between vertical fins against which floating cakes of ice press upward, and is forced out into the room by a double centrifugal fan.

The high velocity of the air between the restricted passages of the fins and the water surface causes a water circulation in the tank that is very evident by dropping cigarette ashes into the water.

Cabinets will be finished in walnut or mahogany, and as shown in the adjoining cross-sectional drawing, stand 46 in. high, 39 5/16 in. wide, and 19 5/16 in. deep, overall. Cabinets are built by the Motor Products Co., Detroit. They are mounted on rubber-tired wheels (two swivelled) which the Colsom Co. of Elyria, Ohio, manufactures.

The motor is a ⅛-hp. split-phase motor, loaded to about 120 watts, which drives the two centrifugal fans to discharge 200 cu. ft. of air per minute at a velocity of 400 ft. per minute.

A full ice charge consists of six 50-lb. and one 25-lb. cakes of ice, loaded from the top. This charge lasts about ten hours.

The water level in the ice tank is maintained constant by draining excess water, introduced by condensation, into a drip pan in the bottom of the cabinet which also collects humidity condensed on the outside of the ice tank. Since air on both sides of the outer shell is at room temperature, no condensation occurs on it, Mr. Bright points out.

The cooler is drained by gravity from the bottom, or through the three-way cock at the top by using a water ejector or a small water pump.

MODINE'S 'ICE-FAN' BUILT WITH SECTIONAL UNITS

RACINE, Wis.—Designed for cooling and dehumidifying room air, a portable Ice-Fan is being manufactured by the Modine Mfg. Co. here. Ice is used as the refrigerant.

The Ice-Fan is a small tube-shaped cabinet built in three separate sections—the top section containing the power unit and blower, the intermediate section being the ice container, and the bottom section serving to collect the moisture from dehumidification.

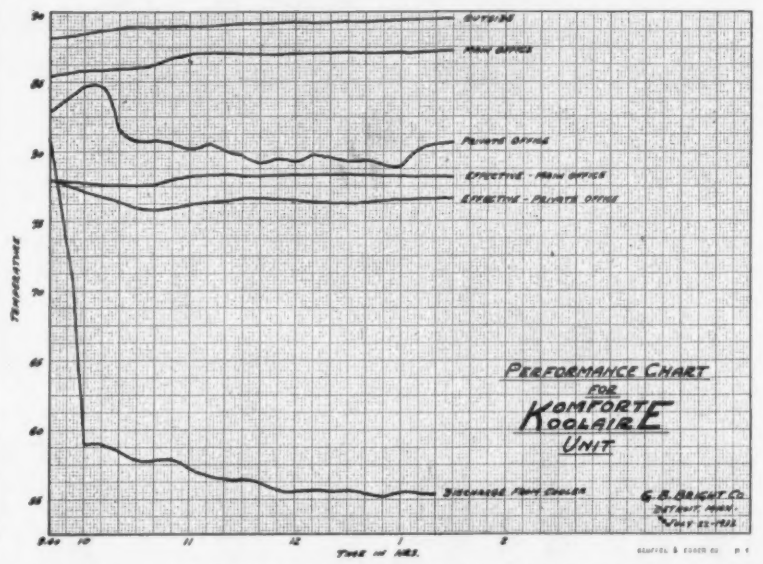
Since each section is complete within itself, any number of ice sections may be used in the unit.

The Ice-Fan draws warm air from the room through the ice-cooled passages of the unit's ice section (or sections), and then blows the cooled air out into the room through grilles at the top of the unit. An air deflector controls the direction of the air stream.

Contact with the metal passages in the ice compartments dehumidifies the air, the condensed moisture flowing downward into the base of the Ice-Fan, which acts as a drain pan. Overflow of the pan is prevented, since the water, before reaching the spillage point, traps the air movement, and prevents further accumulation of moisture.

Each ice section has a 75-lb. ice capacity. In hot weather, say the manufacturers, a unit equipped with two sections will melt 20 lbs. of ice per hour, and that the unit will lower the air temperature as much as 25° F.

Performance Record



A performance test of the new Komforte Koolaire, made with thermo-couples, gave the above temperatures in Mr. Bright's office, the outer office, and out-of-doors during a typical hot July day.

ChilAire Uses Dry Coils, Cooled by Ice Water

KANSAS CITY, Mo.—ChilAire, a portable air cooler using ice as a refrigerant and designed to cool, dehumidify, and circulate air, has been placed on the market by the ChilAire Corp. here. The unit is equipped with an ozonator, for freshening the air.

The unit employs the dry system of refrigeration. Water from the ice tank is circulated through a radiator-type heat absorber. The warm air, pulled through the absorber, is cooled and dehumidified.

The ice tank, with a 250-lb. capacity, is located at the back and bottom of the cabinet, and is iced by removing a panel from the unit. Water from the melted ice is removed by drain or pump.

is your!

Product Good to the Core?

The core is really the foundation of quality in cabinet construction. That's why many leading manufacturers have standardized on SUPERIOR GALVANNEALED and SUPERIOR SUPER METAL. These sheets solve at once two important problems in cabinet production.

SUPER METAL is made from a special analysis, copper content steel coated with prime spelter by a special process. Through this treatment the coating is thoroughly amalgamated with the base sheet.

SUPER GALVANNEALED is similar in all essentials to SUPER METAL. The base sheet is of special analysis open hearth steel. It is zinc coated by the same heat treatment process.

Both sheets are unexcelled for construction of Kitchen Equipment, Refrigerators, Ice Cream Cabinets and diversified products requiring a fine finish, uniformity, a high degree of rust-resistance, workability, long life and other qualities that are desirable in fine cabinet construction.

Samples and Booklet on Request

The Superior Sheet Steel Co.

Canton, Ohio

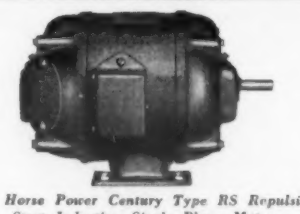
Division of Continental Steel Corporation

Manufacturers of: Black, Galvanized, Long-Terne and Special Coated Sheets, Roofing and Kindred Products; Billets, Rods, Wire, Nails and all types of Fence.

- The patented heat treating process fuses the coating to the base metal, affording unusual resistance to rust.
- The sheets are soft and ductile and the coating will not chip, flake or peel under the most difficult forming operations.
- Offers an ideal surface (a bond) to which paint, lacquer and enamel finishes can be applied, without special treatment, and it will retain these finishes under severe conditions of use.
- Through the widespread adoption of this special coated sheet metal cabinet manufacturers are offering the highest efficiency obtainable.

"Superior Super-Metal" PATENTED PROCESS

Superior Galvannealed PATENTED PROCESS



1/6 Horse Power Century Type RS Repulsion Start Induction Single Phase Motor

This Means a Lot to Motor Users

Century Electric Company started in business in 1903. That in itself means nothing. But, *this* means a lot:

The first motors that ever went out under the Century trade mark "Kept a-Running," simply because they were *built right*—right from the start. They have always been *so* right that they have been actually responsible for many advancements in the electrical industry.

For instance, they played a most prominent part in popularizing the use of motorized equipment when lighting circuits were the only available source of power . . . Again, when the Electrical Refrigerator and Oil Burner Industries were in their infancy, *their motor problems had already been solved by Century*—not with a specially built motor, but with a motor *already* so right that it met every exacting service requirement.

Many other similar instances could be cited to indicate Century's leading place in the picture of industrial development during the last 28 years. It points definitely to one thing:

No matter what your requirements are, you will profit by an investigation of Century Motors.

Century MOTORS

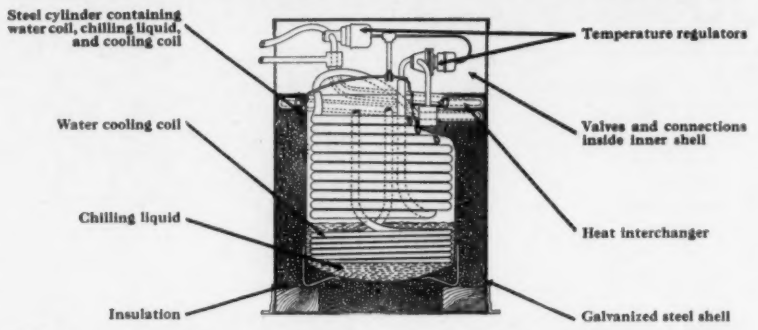
CENTURY ELECTRIC COMPANY, 1806 Pine St., St. Louis, Mo.

Offices and Stock Points in Principal Cities

ALTERNATING AND DIRECT CURRENT, SINGLE PHASE, POLYPHASE, SPLIT PHASE, MULTISPEED AND SPECIAL MOTORS, RANGING IN SIZE—DEPENDING ON TYPE—FROM 1/60 TO 250 H. P.

FOR MORE THAN 28 YEARS AT ST. LOUIS

Double Refrigerant Water Cooler



When water enters the cooling coil, the secondary refrigerant (chilling liquid) boils, and is subsequently condensed by the primary refrigerant. The cooling tank is insulated with cork.

* * *

FRIGIDAIRE DEVELOPS 2-REFRIGERANT UNIT

(Concluded from Page 1, Column 5)

water and one of copper for sweet water.

"One of the features of the double refrigerant system in soda fountains is that it permits the entire compressor capacity to be automatically transferred to the water cooler for short periods of time to meet peak loads," said Newill. "This is helpful to the retail store proprietor who wants to provide his customers with cold drinking water during the busiest rush hours."

Three tank-type water coolers with capacities of 8, 25 and 45 gallons per hour recently announced by the company make use of the double refrigerant principle. These have been adapted to the cooling of soft drinks and other beverages.

AIRTROL UNITS CARRY AS HIGH AS 12 TONS

WILLIAMSPORT, Pa.—Air-conditioning loads from three to 12 tons can be handled by the Airtrol equipment manufactured by the J. H. McCormick & Co.

Airtrol equipment is being handled as a companion line by a number of electric refrigeration distributors.

The machines are offered in several different models, using either indirect cooling or direct expansion of a refrigerant for cooling air, and with or without heating and humidity control for winter operation, according to W. H. Campbell, vice president in charge of sales. The company also manufactures a comfort cooler using ice.

"We have found that discharge velocities of 2,000 ft. per minute can be made quietly, will carry distribution 100 ft., and promote the desired turbulence both winter and summer," Ralph P. Clarkson, chief engineer of the Airtrol division states. Winter and summer, we find six air changes per hour work out well in the small space.

"For cooling, direct expansion through fin type radiators, with the air drawn through at 500 ft. per minute, and then directionally controlled, is most economical, and permits the greatest efficiency of the mechanical compressor.

"With floor radiation in winter, the air may be so stratified as to give as high as 30° F. difference between floor and ceiling—a wasted heat load. By proper circulation—dynamic air energy—the fuel can be cut down and heat distributed properly throughout the space," he says.

"On the other hand, in summer the refrigeration load is cut down by circulating the air," he believes. "You get rid of that dead clammy feeling, and higher temperatures can be maintained with comfort, thus decreasing the tremendous contrast between outdoors and indoors that is so objectionable to many," he states.

* * *

Campbell Incorporates Noise Elimination In Conditioner

(Concluded from Page 1, Column 3)

trols the amount of air brought into the room.

The outdoor air is drawn through a "Filtro-Bac Mat" before it enters the sound-absorbent labyrinth. This mat cleans the incoming air, while the recirculated room air is drawn through a sodium calcium hydrate filter.

Humidification is supplied by means of an automatically operated water reservoir contained in a radiator (designed by the American Radiator Co.) within the enclosure with the silencer and air filter.

This radiator also heats the room, and maintains a constant temperature by means of an Arco Radiatherm (product of Detroit Lubricator Co.).

The same enclosure contains a cooling coil for cooling and dehumidifying the air in the room, the condensing unit being adapted to installation in an adjacent room. The cooled air is recirculated by the same unit which recirculates warm air during the heating period.

Six types of units are now being manufactured by the Campbell company. Model A is designed to eliminate noise, ventilate, and clean the air in the room where it is installed. It is priced at $85, delivered, and is made for installation in buildings already constructed. It is installed on the window sill.

Model A-1 accomplishes the same results as does Model A, but is for installation in buildings under construction.

Model B is designed for installation in existing buildings to eliminate noise, ventilate the rooms, clean the air, heat, and humidify the air. Installation of this model is made by removing the existing radiator, and installing in its place a radiator which contains a water reservoir. Moisture, drawn from this reservoir by the heated air, is circulated in the room by the air-intake fan of the silencer mechanism.

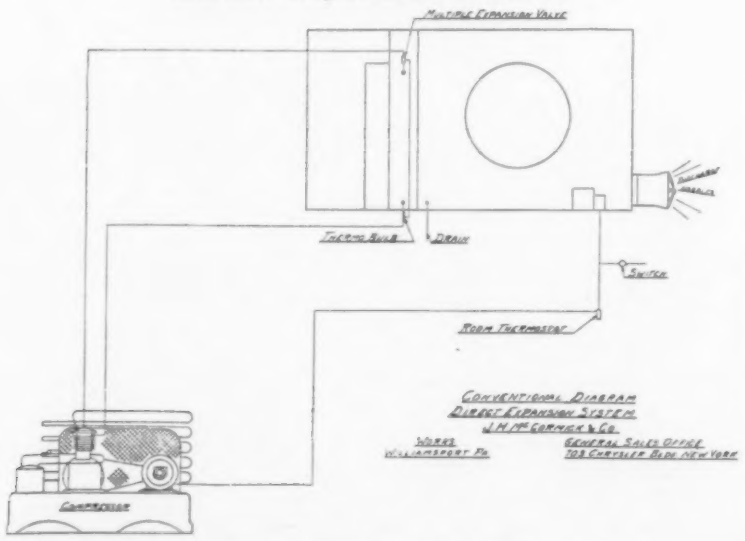
Constant room temperature is maintained by an Arco Radiatherm which also regulates the humidity. Outdoor air is drawn into the unit by means of a flange which projects outside, under the base of the window. The price of the unit installed (costs of plumbing connections excepted) is $245.

Model B-1 supplies the same elements of air conditioning as Model B, but is designed for installation in buildings under construction.

Model C accomplishes noise elimination, ventilation, air cleaning, humidification, heating, dehumidification, and cooling. It is for installation in existing buildings. The equipment is the same as that used in models B and B-1, with a cooling coil added beneath the radiator enclosure, and a condenser installed in an adjacent room. The cost is $645 plus the cost of electrical and plumbing connections.

Model C-1 offers the same features as Model C, but is for installation in new buildings.

Direct Expansion Airtrol



Direct expansion is a common method with Airtrol cooling equipment.

NEW VENTILATING FAN ANNOUNCED BY ROSS

(Concluded from Page 1, Column 1)

for window installation, has an air output of 600 cu. ft. per minute, fits windows 24 in. to 34 in. in width, has a 10-in fan, and sells for $39.50.

Model 500, priced at $24.50, has the same size and air output capacity as Model 600, but is finished in gray enamel, with cadmium-plated trim.

Model 450 is designed for wall installation. It exhausts 450 cu. ft. of air per minute, has an 8½-in. fan, requires a wall opening 10½ in. square, and will fit any brick or frame wall. Its price is $44.50.

Model 650, also for installation in any brick or frame wall, has an air output of 600 cu. ft. per minute, requires a wall opening 12½ in. square, and has a 10-in. fan. It is priced at $49.50.

WORKERS PERFORM BEST FROM 40 TO 70 DEGREES

NEW YORK CITY—Human beings perform at maximum efficiency only between the temperature limits of 40° to 70° F., according to a report issued by the Policyholders Service Bureau of the Metropolitan Life Insurance Co., entitled "Air Conditions and the Comfort of Workers."

The report also states that employes can do four times as much work in a temperature of 100° F. when the relative humidity is 30 per cent, than when the latter is 100 per cent.

The report is based on a series of laboratory tests.

What is it?

Who knows what make of compressor is pictured above? A subscriber has asked where to buy service parts. Any information will be welcome.

CONVECTORS TO SAVE SPACE

DETROIT—Designed to conserve space by overhead or out-of-the-way installation, a new "Convector" for use with heating, cooling, and dehumidifying systems has been placed in production by the McCord Radiator Co.

LEWIS HAS BOTH ICE AND ELECTRIC COOLER

MINNEAPOLIS—Lewis Air Conditioners, Inc., is now manufacturing two mechanical air-conditioning systems and two space coolers using ice as a refrigerant.

The M-3 model air conditioner is a custom-built unit engineered for the specific requirements of the enclosure in which it is to be used. It may be used for all heating and air-conditioning purposes, or merely as an auxiliary to any steam or hot-water heating plant to provide washing, humidifying and dehumidifying, and circulation of the air.

Model M-2 is a standard production unit for winter air conditioning, and is installed with steam or hot-water heating plants.

In the Lewis space cooler of the remote ice chamber type, the heat absorber, motor, and fan are housed within the walnut cabinet. The ice-melting chamber is located in the basement, where a circulating pump forces low-temperature water to the individual units. Condensed moisture from the cooling units is drained off through the basement sewer.

The wood cabinet with heat absorber, 4-speed motor, and fan is a standard production unit. The ice-melting tank and the circulating pump vary according to each installation's requirements.

The Lewis portable space cooler is a standard production, self-contained room cooler using ice as the refrigerant.

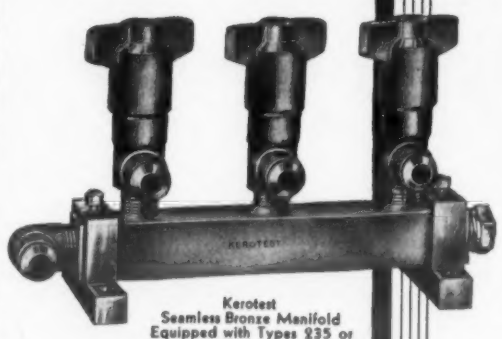
In addition to this equipment, the company manufactures a portable electric humidifier with sufficient evaporative capacity to fill the moisture requirement in one or two rooms.

KEROTEST

seamless bronze

MANIFOLDS

for trouble-free apartment refrigeration service



Kerotest Seamless Bronze Manifold Equipped with Types 235 or 236 Packed Valves and Wing Nut Seal Cap.

The tubing of all Kerotest Manifolds is made of a special quality of durable bronze, not brass—why there is no danger of splitting a genuine Kerotest Manifold when taper pipe fittings are properly inserted.

Moreover, all fittings are inspected individually to insure smoothly finished seats and proper threads, then individually protected by cardboard ferrules and securely packed in strong iron-banded boxes.

Kerotest Seamless Bronze Manifold Equipped with Type 297 Diaphragm Packless Valves.

This is a characteristic example of the meticulous care and forethought that goes into every detail of Kerotest manufacture—why you can specify Kerotest with the utmost confidence.

Thirty-five pages of essential information of interest to every refrigerator engineer and service man can be found in the Kerotest catalogue on Refrigerator Valves and Fittings. Send for your copy.

KEROTEST MANUFACTURING CO.
PITTSBURGH, PENNA.

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George Bright Defines Comfort Cooling Principles

BOTH TEMPERATURES, HUMIDITY CORRECTED IN 'COMFORT COOLING'

Editor's Note: Simple and clear definitions of air-conditioning principles are presented on this page by George Bright, consulting engineer of Detroit. Of particular interest are Mr. Bright's distinctions between "Comfort Cooling" and complete air conditioning. The article below was abstracted from a skit given by Mr. Bright and his daughter, Miss Elizabeth Bright, before the Illinois and Michigan ice associations.

AIR conditioning, regardless of outside weather or climatic conditions, consists of the constant control of the atmospheric condition of air within an enclosure, with reference to temperature, humidity, circulation and cleanliness.

The fundamental principles involve:

1. Temperature control by heating or cooling.
2. Humidity control by humidifying or dehumidifying.
3. Air movement or circulation.
4. Cleansing by filtering and washing.

A complete air-conditioning system must include all of these principles.

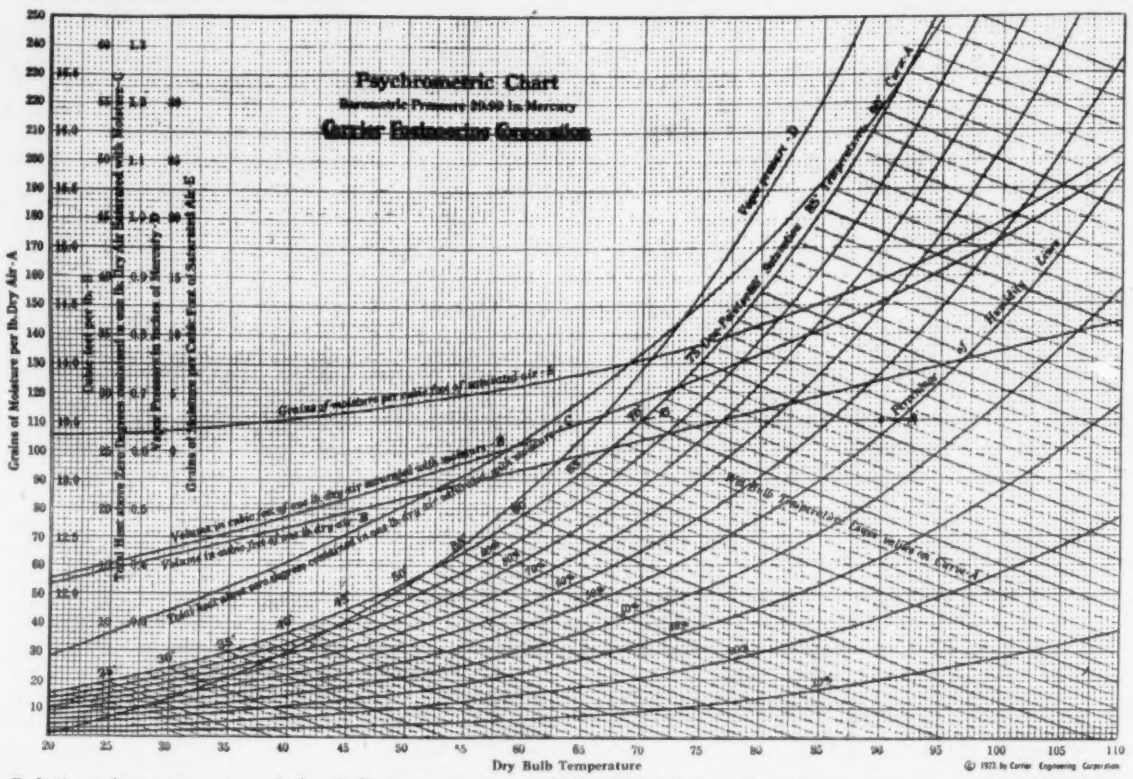
Comfort cooling consists of reducing the temperature or humidity of air used by human beings within an enclosure, with relation to the outside or climatic conditions.

The basic principles are:

1. Air movement or circulation.
2. Lowering of temperature by cooling.
3. Reduction of humidity by dehumidifying.

Comfort cooling does not necessarily include all of the principles involved in air conditioning. Certainly, heating or humidifying air is not a requisite of comfort cooling; while any single one of the following principles such as cooling, dehumidifying or circulation—or the combination of circulation with cooling or dehumidifying, filtering or washing—would aid in the improvement of air for human comfort.

There are two conventional systems of comfort cooling: the unit system, which is self-contained and is used for cooling a single room; and the remote system, used for one or more rooms.


Psychrometric Chart
Barometric Pressure: 29.92 In. Mercury
Carrier Engineering Corporation
Grains of Moisture per lb. Dry Air-A
Dry Bulb Temperature
Grains of moisture per cubic foot of saturated air-B
Grains of moisture per cubic foot of saturated air-A
Curve A
Curve B
Humidity Lines
Wet Bulb Temperature Lines
Volume in cubic feet of one lb. dry air saturated with moisture-B
Volume in cubic feet of one lb. dry air saturated with moisture-A
Total heat above zero degrees saturated with moisture-B
Total heat above zero degrees saturated with moisture-A
Weight of moisture in grains per cubic foot of saturated air-B
Weight of moisture in grains per cubic foot of saturated air-A
© 1923 by Carrier Engineering Corporation

Relations between wet and dry-bulb temperatures, relative humidity, and moisture content are charted above.

There are several different kinds of units: the portable unit uses ice only; the air is circulated by a fan or blower. Cooling and dehumidifying are effected by several methods: one is by blowing air over fins which are in direct contact with the ice, another by blowing the air through a cooling element in which cold water is circulated by a pump.

Where the cooling element is of the open type, such as sprays or drip-troughs, cleansing is also accomplished. Some units are also provided with filters. The unit is mounted on casters so that it can be moved readily, and for convenience in charging with ice and removing water.

The stationary unit uses ice or mechanical refrigeration. The operation of the unit using ice is the same as the portable unit, except that permanent connections are required for power supply and removing of water.

Heat Must Be Discharged

The mechanical refrigerating unit consists of an evaporator with a fan or blower for circulating the air. The compressor unit may be either air or water cooled; if air cooled, it must be located so that the heat generated by the motor and compressor does not come in contact with the air circulated through the unit.

Permanent connections must be provided for power supply for both fan and compressor motors, liquid, gas and drain for air-cooled unit; and water inlet and outlet and drain for water-cooled unit.

There are two types of remote systems—the duct and remote unit types.

The duct system consists of a unit with blower for circulating the air through the unit and ducts for discharge and return of the air for one or more rooms.

Cooling and dehumidifying are effected by spraying the water which has been cooled into the air as it is circulated through the unit, the water having been cooled by a cooling element located outside of the unit. The cooling element is placed directly inside the unit in some systems and the water is circulated and cooled within the unit.

The remote unit type consists of a means for cooling water in a central location. The water is circulated by a pump through unit type coolers, located as desired in a room or any number of rooms. Each remote unit type cooler is equipped with a fan for circulating the air, eliminator and drain connection.

Both types of remote systems use either ice or mechanical refrigeration.

Dry and Wet Bulb Temperatures

There are two temperatures to be considered; they are the dry-bulb and wet-bulb temperatures.

The dry-bulb temperature indicates the intensity of heat; it does not give any indication of the quantity of heat contained in air. The wet-bulb temperature is the dominating factor in air conditioning and comfort cooling.

Human beings require air for two purposes: respiration and removing body heat. The average adult requires about a pound of air per hour for respiration.

Atmospheric air always contains water vapor. It is necessary to know the amount of moisture present in order to determine the amount of sensible and latent heat contained. This can best be determined by knowing the wet-bulb temperature.

The wet-bulb temperature can be obtained with an ordinary thermometer by covering the bulb with a moistened wick or gauze and placing it in rapidly moving air; for still or slow-moving air by rapidly swinging the thermometer.

The amount of moisture in the air is determined by obtaining the dry- and wet-bulb temperatures and referring to the psychrometric chart, shown above. Air may contain varying quantities of moisture at the same temperature.

A cubic foot of air at 90° is saturated when it contains 14.6 grains of moisture. If it contains only 7.8 grains it is 50 per cent saturated. The amount of moisture is referred to as *relative humidity*. These relations are shown in the Carrier psychrometric chart (above).

Example 1: Having a dry-bulb temperature 90°, wet-bulb temperature 75.6°, find the percentage of relative humidity. In A, Fig. 1, where wet- and dry-bulb lines intersect, interpolation indicates 53 per cent relative humidity. The dew point temperature, 70°, is found by following the horizontal line to B, curve A.

The dew point is the temperature at which the moisture in air begins to condense into mist or dew.

Suppose we consider cooling 357.7 cu. ft. of air (or 24.4 lbs.) from 90° F. dry-bulb temperature and 53 per cent relative humidity to 70° F. wet- and dry-bulb, or saturated. This would be equivalent to melting one pound of ice.

If we raise the relative humidity to 80 per cent and repeat the operation, it would be equivalent to melting 2.4 lbs. of ice. Now let us consider where the additional heat came from. The only change made was increasing the relative humidity from 53 per cent to 80 per cent.

We started with eight grains of moisture per cu. ft. and had the same at the finish. Thus the total heat removed was in the form of sensible heat. By increasing the relative humidity to 80 per cent we started with a total of 11.7 grains of moisture per cu. ft., so in addition to removing the sensible heat, we had to remove the latent heat by condensing 3.7 grains of moisture per cubic foot.

Effective Temperature

There are a number of combinations of wet-bulb and dry-bulb temperatures that produce the same effective temperature.

By research conducted by the American Society of Heating and Ventilating Engineers, a group of engineers has produced an *Effective Temperature Chart* which shows *Optimum Comfort*.

As will be noted in this chart, below, there is a wide range of humidity and dry-bulb temperatures for any given effective temperature. There are other factors, however, to be considered such as air movement and clothing.

We often hear the expression on a hot humid day that the heat would be terrible if it were not for the breeze. Heat produced by the human body is emitted first to the blanket of air immediately surrounding it. An increase in velocity provides equal comfort with increase of both dry- and wet-bulb temperatures.

Heat of Human Body

The total heat produced by the human body is about 400 B.t.u. per hour for the average man at rest. The heat is emitted by radiation, convextion and evaporation.

When the air surrounding the body is increased in temperature, the heat given off by radiation and convection decreases and that by evaporation increases accordingly.

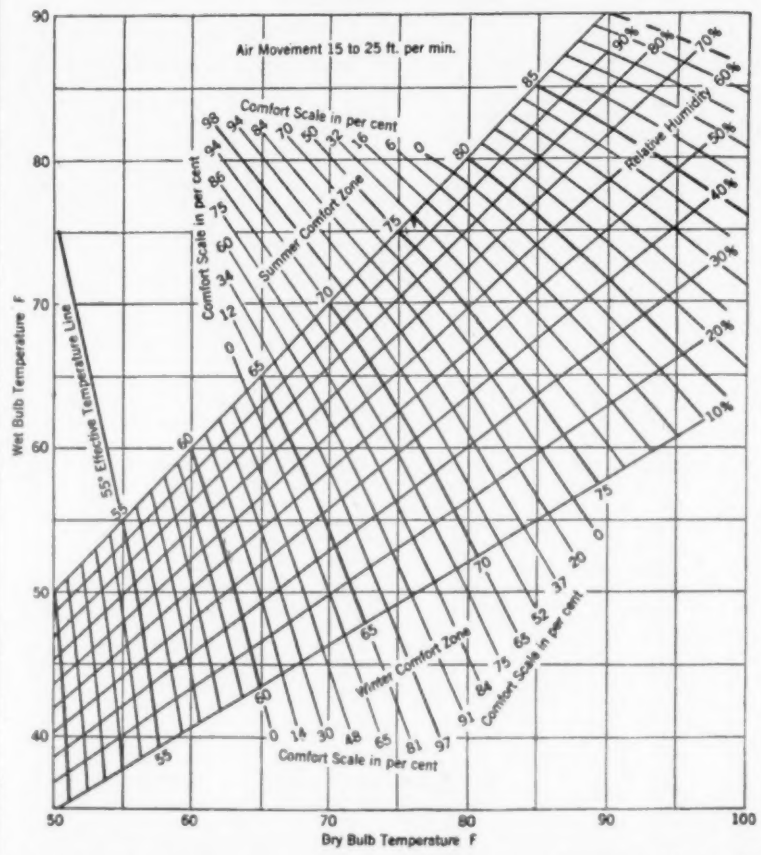
The bodily heat loss for varying "dry-bulb" temperatures will be approximately as follows:

Dry-bulb temperatures	70°	86°	100°
By radiation and convection.	76%	38%	
By evaporation of perspiration and respiration	24%	62%	100%

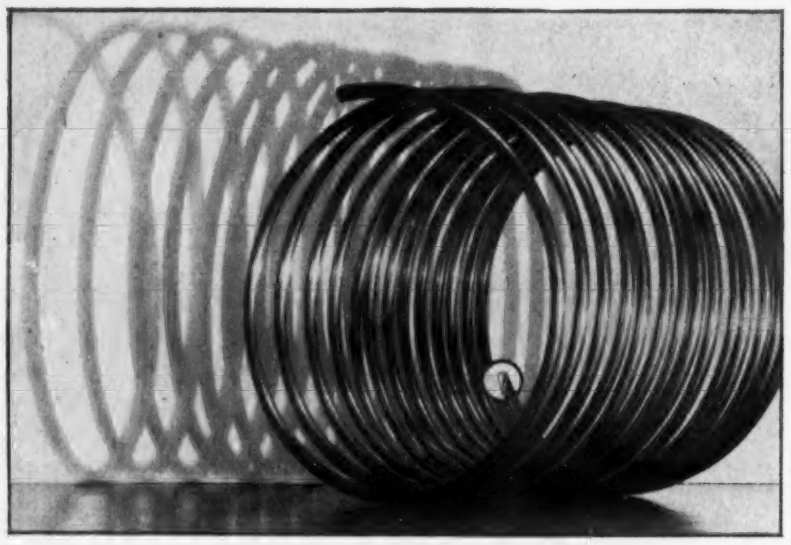
Since the average human body temperature is 98.6° F. and heat will not flow from a cold to a warm body any more than water will flow up hill, it is obvious then that any heat removed above the body temperature must necessarily be removed by perspiration. Here, the human body is a fine example of the wet-bulb thermometer.

The circulation of the air has a definite effect on health, as is shown by the fact that state laws fix the minimum to be circulated in schools, public buildings and places where people congregate. There is no question but that proper temperatures are also very necessary for good health.

Comfort Zone


Air Movement 15 to 25 ft. per min.
Comfort Scale in per cent
Summer Comfort Zone
Winter Comfort Zone
Relative Humidity
55° Effective Temperature Line
Wet Bulb Temperature F
Dry Bulb Temperature F

By trying various effective temperatures on many human subjects, the A.S.H.V.E. plotted the summer and winter "comfort zones." The figures on each line of effective temperature indicate the number of people who felt most comfortable at that point.



FRENCH TUBES to fill every standard and special need

THERE ARE French Copper Refrigeration Tubes . . . small diameter and thin wall seamless tubes . . . for every refrigeration requirement.

Stock sizes are 1/4 in., 3/8 in., 7/16 in., 1/2 in., 5/8 in., and 3/4 in., all in .035 in. gauge. Heavier gauges can be made to order. Stock coils are 25, 50 and 100 feet long. Longer lengths can be supplied at short notice.

French Deluxe Copper Refrigeration Tubes are free from oxide and foreign matter. Each coil is *completely* dehydrated sealed, rigidly tested and reaches you ready for use. For manufacturers who prefer to do their own dehydrating, the French Manufacturing Company produces copper tubes dried (commercially dehydrated), with either open or closed ends.

All French Copper Refrigeration Tubes possess the requisite properties for lasting, dependable service. Their grain structure is uniform. This important quality is in every coil because highest metallurgical skill, long manufacturing experience and only the best of raw material go into their production. Additional information will be furnished upon request.

THE FRENCH MANUFACTURING CO.
General Offices: Waterbury, Connecticut

FRENCH REFRIGERATION TUBES

Minneapolis-Honeywell Co. Constructs Controlled-Temperature Test Room

By P. E. Seepe, Minneapolis-Honeywell Regulator Co.

TO adjust the thermostatic devices manufactured by the Minneapolis-Honeywell Regulator Co., an air-conditioned test room has been constructed which produces any desired uniform condition of temperature, humidity, and air motion. The four walls, floor, and ceiling are of solid insulated masonry construction, to eliminate sun effect, while the air-conditioning system itself is installed in a special penthouse above.

Until the test room was completed, the calibration of thermostats had to be done in an atmospheric condition which was more or less at the mercy of prevailing outside conditions of humidity, sun effect, and summer temperatures. Now thermostatic adjustment is easily and accurately accomplished, with the employes working under healthful and comfortable conditions at all times.

The effectiveness of this air-conditioning system with its extremely accurate control was demonstrated by 24-hour temperature records. A day's chart before me shows that the wet-bulb temperature stayed practically constant at 63° F., while the dry-bulb temperature at no time exceeded 71° or dropped below 70½° F.

Special Test Room

The above illustration cites only one of the many possibilities for air conditioning as it applies to the industrial field. The same company maintains in its laboratory one of the most complete test rooms of its kind in the country.

This room on three sides is built up of typical building construction, the exterior of which is surrounded by another chamber. Within this second chamber through the medium of a refrigeration plant, fans, etc. it is possible to create artificially almost any outside weather condition, including sub-freezing temperatures.

This permits the testing of various air-conditioning controls within the room based upon any desired outside weather conditions. By means of the refrigerating system, the temperature within the cold-chamber can be lowered to any desired point.

The adjoining illustration shows the interior of the test room.

Controls Important Factor

In commercial and public buildings, air conditioning in varying degrees of completeness has been in effect for some time, especially in those places where a comparatively large number of people are periodically assembled.

It has been said before that an air-conditioning system is no better than its control. By way of verification, it must be born in mind that the maximum capacities of the various units which go to make up a complete air-conditioning system are required only a very small part of the time, and the actual output must vary in order to compensate for changes in an air-conditioned space effected by changes in outside air conditions.

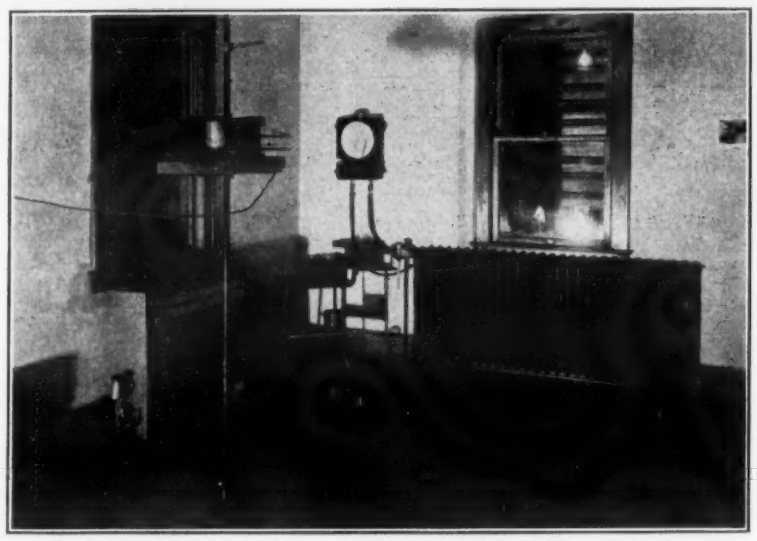
For example, a heating coil, a humidifier, a dehumidifier, or a cooling unit, all of which may be a part of an air-conditioning system, are designed to have a certain maximum output. If these component units were operated so that each or any of them created an excessive condition, they might actually work to the detriment of the health of the occupant of the air-conditioned space.

Dependent on Control

Thus, under proper automatic control, the possibility of over- or under-heating, excessive or deficient moisture content, etc. is eliminated. Therefore, the degree of health and comfort derived from a system of air conditioning is directly dependent on its automatic control or regulation.

There is another important angle of automatic control in its relation to air conditioning. There is a certain yearly cost connected with the securing of heat, cooling, humidification, or whatever phase of air conditioning it may be. Any of these phases carried to excess through improper regulation, represents a relative loss in dollars and cents. Therefore, proper automatic control applied to an air-conditioning system not only assures satisfactory operation of that system, but represents an investment which yields a substantial return.

Air-Conditioned Thermostat Test Room



Interior of Minneapolis-Honeywell's insulated test room which produces almost any desired condition of temperature and humidity for tests.

CITES ADVANTAGES OF ICE FOR AIR CONDITIONING

NEW YORK CITY—The fact that ice is readily available in many localities, or can be manufactured to meet air-conditioning needs, is an advantage for ice as a refrigerating medium for air conditioning, according to R. T. Brizzolara, consulting engineer.

Other advantages of ice are that its rate of melting can be varied to give a wide range of refrigerating effect for air cooling, and its rate of consumption in air-conditioning systems can be entirely independent of the rate of production, he claims.

BAKER COOLERS USED FOR OPERATING ROOM

FORT WORTH, Tex.—One of the two operating rooms in the All Saints Episcopal Hospital here is being equipped with Baker air-conditioning equipment. The room has 3,160 cu. ft. of space and an occupancy load of eight persons.

Included in the equipment is a Baker C-7-MHW condensing unit, and a Trane 62 DE cabinet type cooling unit, handling 500 cu. ft. of air per minute, installation engineers state.

40 Conditioners Use Lewis Humitrols

MINNEAPOLIS — Lewis Humitrols, manufactured by Lewis Air Conditioners, Inc., to control the operation of any equipment which adds or withdraws moisture from the air, are now being used by 40 manufacturers of air-conditioning equipment, according to Albert G. Mather, vice president.

When attached to any system which completely conditions the air, the Humitrol will maintain the desired humidity by controlling operation of the equipment which adds moisture, or will dehumidify the air by controlling the moisture extraction.

The Humitrol is set at the desired humidity percentage by means of an adjusting screw to which is affixed a dial indicator. This indicator is visible though a small opening at the bottom of the Humitrol's front cover.

The instrument is operated by the amount of moisture in the air, and is not affected by dry-bulb temperature. It is placed in the room to be air-conditioned, so that the moisture in the air comes in contact with the mechanism.

Within the Humitrol is a hygroscopic ribbon-type element which expands or contracts as the moisture content of the air varies. This action is multiplied within the instrument by a lever mechanism which serves to operate a mercury tube switch. This switch, in turn, starts or stops the humidification or dehumidification equipment.

All Humitrols are calibrated at the factory for a maximum operating range within 3 per cent plus or minus of setting. The instruments may be calibrated to maintain any relative humidity up to 60 per cent.

To control dehumidification equipment, the position of the mercury tube is reversed so that the Humitrol cuts in when relative humidity rises above the desired percentage.

HUMIDITY CONTROL IS BUILT BY H. J. SOMERS

DETROIT—Three products in the field of air-conditioning equipment are being manufactured by H. J. Somers, Inc.—a humidistat, a portable ice cooler for railway dining cars, and an automatic humidifier and air washer.

The humidistat provides regulation of humidification and dehumidification equipment. A feature of the device is that it will control a load as great as that of a 1/20-hp. motor without using a relay, as well as the 110-volt solenoid valve. A transformer and a relay are used when larger currents must be handled.

The dining car ice cooler, 22x22x42 in. in size, has a vertical down-shaft drive centrifugal fan delivering 525 cu. ft. of air per minute. The cabinet has a capacity of 250 lbs. of ice. One charge of ice will last for eight hours under an 85° room temperature, Mr. Somers claims. The complete unit sells for $125.

The automatic humidifier and air washer manufactured by the company has an evaporating capacity of 30 gals. of water in 24 hours at a water temperature of 130° F., and has sufficient humidification capacity for the entire average home.

Air is brought to the humidifier (which is installed in the basement) through a metal duct, and is then passed over 70 sq. ft. of moist plates. The sprays in the humidifier are of the self-cleaning type, and are operated by an electric solenoid valve which is controlled by the humidistat. Having been cleansed and humidified, the air is returned by another duct to a central location in the home. (See description on page 14 of installation in the home of Louis Ruthenburg, president of Copeland Products, Inc.)

The company also designs larger units with which refrigerating coils may be combined for dehumidifying and cooling.

200 AIR CONDITIONING JOBS USING RADI-ION

CHICAGO—Radi-Ion ionizers, manufactured by the Radi-Ion Corp. (division of the United States Ozone Co.) here, are now in use in more than 200 air-conditioning projects, according to W. Ray Montgomery of that company.

Type D ionization equipment is most in demand, says Mr. Montgomery, as it is adapted to use in small air-conditioning installations.

This ionizing unit comprises one or more discharge tubes, so arranged that installation is made in a section of the ventilating duct, preferably up-stream with respect to the recirculating fan.

Such a location enables all air to pass the discharge tubes and come in contact with an ionizing field.

Control of this unit is accomplished by means of a rheostat which varies the percentage of ionization, while an automatic contactor permits synchronous operation with the system fan.

Service connection is made to the fuse block, a toggle or cut-out switch being also provided. This control unit is mounted adjacent to, and below the ionizing unit, or may be placed wherever the control of the system is maintained.

Radi-Ion equipment generates ions in the field around its tubes, and supplies these to the recirculating air stream, to keep the air in the room supplied with a normal number of the particles.

BRISTOL MARKETS DIRECT READING HUMIDIGRAPH

WATERBURY, Conn. — The Bristol Co. has placed on the market a direct-reading Humidigraph for determining the relative humidity in the air without use of tables or calculations.

The Humidigraph employs a hygroscopic measuring and actuating element consisting of sensitive wood fibres built up on a nickel wire screen and wound in the form of a spiral.

Changes in relative humidity produce a deformation in the hygroscopic element, with a consequent movement of the free end in angular rotation about its central axis.

The ample torque developed allows the element to be connected to the pen arm by simple linkage, eliminating the necessity for hair springs, rollers, or other delicate mechanisms.

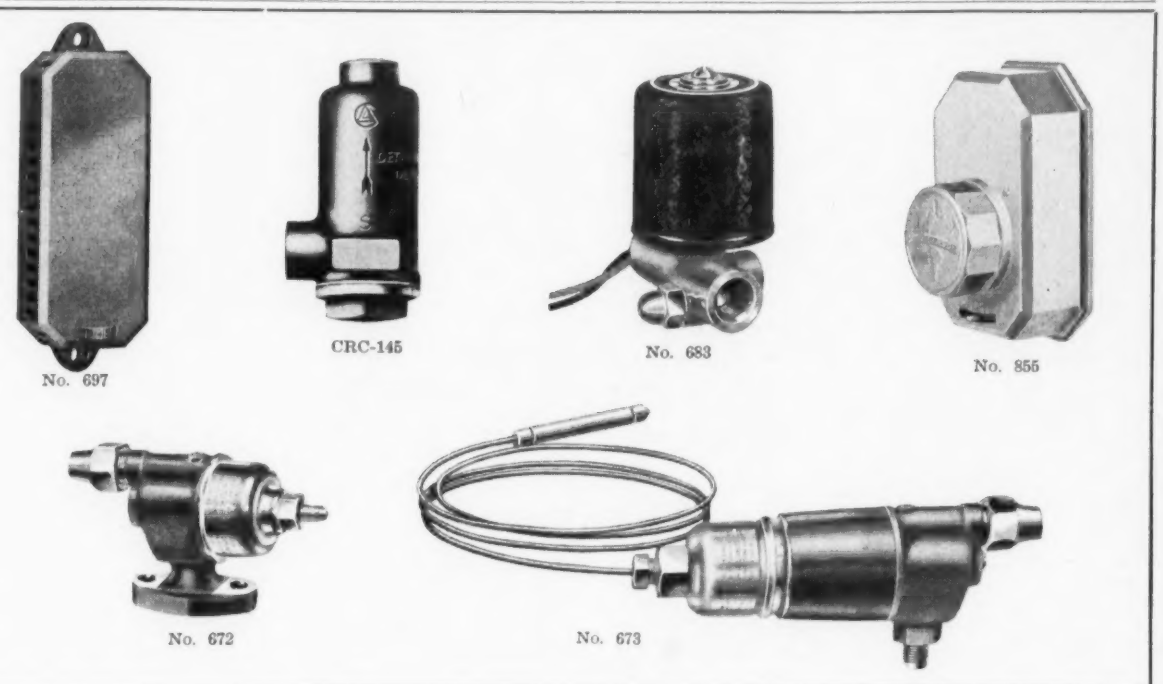
The wood fibres are aged and treated to make permanent the original calibration.

Humidigraphs are available in round case models using 4-in. or 8-in. charts, and are made in portable form or for surface mounting.

The company also manufactures an instrument equipped with two pens—one for recording relative humidity, the other for recording temperatures.

NEW AMERICAN FILTER AGENT

LOUISVILLE, Ky. — The American Air Filter Co. has appointed English and Lauer, Inc., 1224 South San Pedro St., Los Angeles, as its southern California representative.



"GENUINE DETROIT"

AIR CONDITIONING

CONTROLS AND VALVES

There is a complete line of "Genuine Detroit" products to meet every control requirement in air conditioning. Only a few of these products can be shown here. So, whatever your particular problem may be, call upon our engineers to help you with their years of experience in solving your control problems.

No. 855 Mercoid Thermostat offers in a single high-voltage instrument accurate control for both summer cooling and winter heating. No. 444 Thermostat for low voltage also is available. No. 697 Humidistat will control humidification in winter and dehumidification in summer.

No. 683 Solenoid Valve is used with the Humidistat to control the flow of water for humidification, while a similar valve operated by a thermostat will control the flow of refrigerant (including F-12) in multiple cooling units. CRC-145 Strainer should be used with all control valves on water supply.

The No. 673 "Genuine Detroit" thermostatic expansion valve insures maximum efficiency for cooling and dehumidification from air conditioning evaporators. It keeps the coil completely refrigerated at all times as it automatically changes the back pressure in accordance with load requirements. Can be used on either single or multiple installations.

The No. 672 "Genuine Detroit" automatic expansion valve is accepted as standard throughout the industry.

DETROIT LUBRICATOR COMPANY

Trumbull, Lincoln, Marquette & Viaduct

DETROIT, Mich., U. S. A.

Lubricators · Carburetors · Valves

Automatic Controls for temperature, pressure, humidity. Refrigeration, Oil Burner and Heating Accessories

Division of AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Special Parts Developed for Air Conditioning

COOLING COIL DESIGN, LOCATION DISCUSSED

DETROIT—The design and placing of the cooling coils play a very important part in the efficiency of an air-conditioning unit, according to William Higham, Universal Cooler air-conditioning engineer.

Mr. Higham's statement is based on the results of recent tests which were run on a standard 1½-ton Universal cooler, recirculating air conditioner, using an air-conditioning evaporator recently developed by Flintlock Corp. of Detroit.

The evaporator is of standard Flintlock integral fin-and-tube design, 4 tubes deep with 3½-in. fins, having 4 tubes in parallel connected by inlet and outlet manifolds. The finned section is 20 in. high by 22 in. wide; overall dimensions are 22 in. by 25 in. Fin spacing of 6 per inch gives a total surface of approximately 130 sq. ft.

Under maximum conditions, using one coil, air passing through the coil with a lineal velocity of 310 f.p.m., at 90° F. (74° F. wet bulb) entering air temperature, is discharged at 62°, representing a temperature reduction of 28° F.

Under normal conditions, air enters at 80° F. (66° F. wet bulb) and undergoes a temperature reduction of 23½° F., a heat transfer of 13,000 B.t.u. per hour.

Air entering the unit at 70° F. (58° F. wet bulb) can be reduced 21° and discharged at 49° F. The conditioner provides a constant air delivery of 950 cu. ft. per minute.

Perhaps the most noticeable departure from conventional design is the position of the cooling coils, which are located at an angle of 45° from the direction of air flow. This provides a greater effective depth of air flow and takes advantage of a greater part of the prime surface of the cooling coils, the designers point out.

The diagonal placing of the coils, combined with the drain characteristics of the Flintlock surface, also enables the air to blow all free moisture from the coils and reduces the possibility of plugging, the engineers claim.

Another feature of this 45° placing of the coils is the flexibility in the number of complete coils which may be used in the assembly, since the capacity of the unit may be increased simply by the installation of additional coils. According to Higham, the capacity has been doubled by the addition of a second coil headed together with the first, and using a 3-ton compressor.

The coil tubing proper is of 11/32-in. internal diameter. This small tube size permits the use of more tubes in depth in a given space, and also permits the use of smaller "U" bends, which in this particular unit reduces the free by-pass area around the coils to 5 per cent.

The coils are all brass including brackets, headers, and manifolds. The entire surface of the coil provides heat transfer due to the Flintlock design in which the tube and fin are pressed from a single piece of metal, so that there is no joint between tube and fin to interrupt the flow of heat. The slightly corrugated design of the fin itself provides a certain "scrubbing" action of air on fin, which in turn helps the heat transfer, Flintlock engineers explain.

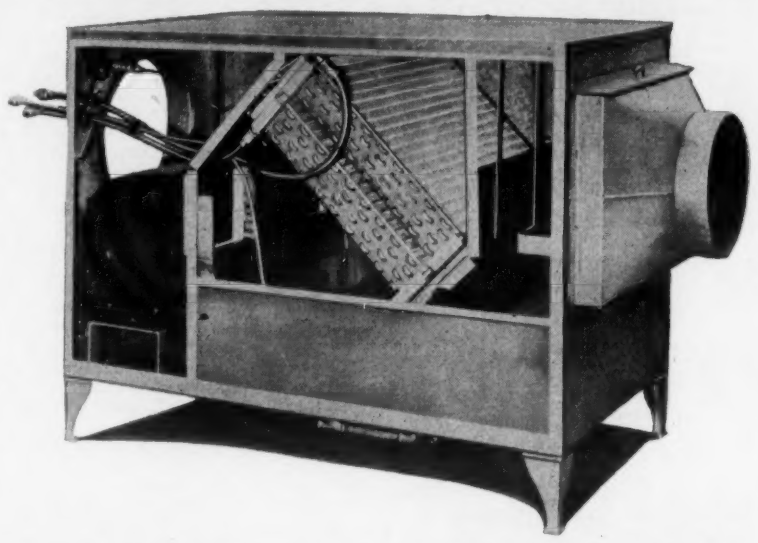
The Flintlock coil is formed by telescoping tubular projections which are drawn from the same sheet of brass as the fins. The assembly of these fin and tube elements produces a series of laminated tubes which are integral with the fin.

The coils are semi-flooded, with the expansion connection at the bottom and suction at the top, and so designed that two suction lines can be run from the evaporator to the compressor. This extra line capacity eliminates the possibility of an excessive pressure drop between these two points.

The coil has sufficient capacity so that it is capable of taking care of overloads at the start-up of the system, the tests show, and easily handles the variation in pressure developed by the American Radiator thermostatic expansion valve with which the unit is equipped. The coil is provided with easy-mounting brackets designed to reduce the amount of space required for the coil proper.

The 5 per cent fixed by-pass area around the coil provides the correct mixture of uncooled air with cooled air to maintain a uniform discharged air condition, Flintlock engineers state.

Flintlock Cooling Coil in Position



Cut-away of air conditioner by Universal Cooler, using Flintlock coils.

ST. LOUIS CONCERN MAKES DOMESTIC UNIT OZONIZER

ST. LOUIS—The Air Conditioning and Engineering Co. here, manufacturer of ozonizers and ionizers, has developed a new unit for application in domestic air-conditioning systems. It is called the Type M unit.

The apparatus is of the gas-filled tube, screen-grid type. The grids are of formed aluminum. There are no moving parts in the device, which operates on 110-volt, 60-cycle, single-phase, alternating current.

For installation, a 6x8-in. hole is cut in the cold air duct, or, in a forced air system, on the suction side of the fan, and the ozonator is inserted into this opening and mounted with four sheet metal screws. It may be mounted in either horizontal or vertical position.

It is attached to any electrical outlet, and is controlled by a regulating switch. The tubes require occasional cleaning with a cloth.

The generating unit is made in four sizes, list prices of which range from $23.75 to $49.25, f. o. b. factory.

In addition to this product, the company manufactures Electrozone ventilating ozonators for public buildings, Electrozone water sterilizers for purifying water, Electrozone ventilating ozonators for use in connection with unit heaters in large buildings, Electrozone warm-air furnace ozonators for homes, Electrozone industrial ozonators for water purification and in industrial purposes, and Electrozone portable ozonators for treatment of air in homes and offices.

UNI-FLO GRILLE CORP. MAKES LINE FOR COMFORT COOLERS

DETROIT—A standard line of grilles for comfort-cooling cabinets, or for wall registers of central air-conditioning systems, is being supplied by the Uni-Flo Grille Corp., which is affiliated with the Allied Products Corp.

Small diffusers are formed along the edge of Uni-Flo grilles to break up the air currents, and deliver the air in a blanket-like manner. Air velocities exceeding 5,000 ft. per minute have been passed through the grilles without the "wind whistle," designers claim.

PUMPS FOR AIR CONDITIONING DEVELOPED BY SCHLEYER

ANDERSON, Ind.—The E. C. Schleyer Pump Co. here has developed water circulating pumps which can be built right into air-conditioning equipment, E. C. Schleyer, president, states. Single-suction, ball bearing brine pumps, with Monel metal on stainless steel shafts are also standard products.

Importance of Filters In Correcting Air Pollution Discussed By Murphy

By Howard C. Murphy, Vice President, American Air Filter Co., Louisville, Ky.

AT a recent conference on air conditioning at the Case School of Applied Science in Cleveland, the writer expressed the opinion that the science of air conditioning is developing with such rapidity that text books are of little value. It is, in fact, impossible to turn to the pages of a reference book to find the solution of our problems. The answer is mirrored only in the minds of the engineers who are developing this field and can be made available to the general engineering public only through conferences, symposiums, and discussions in our technical magazines by investigators in this field.

There is probably no recent development that so intimately concerns our comfort health and efficiency as air conditioning. It is a many-angled field, and a consideration of the possibility and desirability of including air filtration in the design of unit air conditioners should be of interest.

Used in Large Systems

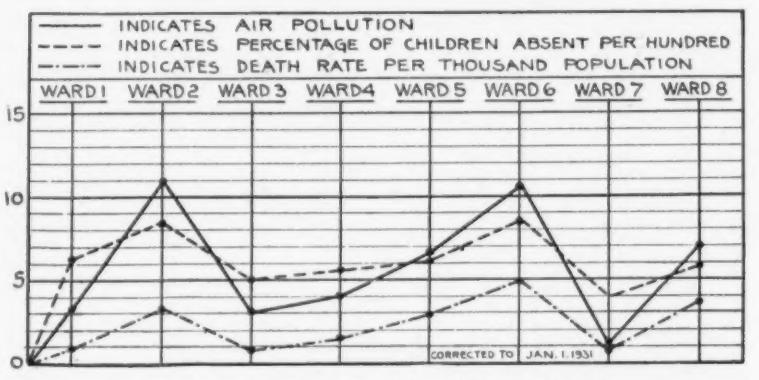
Air filters have, of course, always been considered an integral part of the large central systems. Because of the air volumes handled, air filters are installed to prevent the defacement of interiors caused by soot, smoke and dust in uncleaned air. The extent of this pollution is not usually understood, and it is only recently that the development of accurate instruments for the measurement of air impurities has made it possible to compare even approximately the atmospheric pollution in different cities.

The writer made a survey of 24 cities covering the years of 1924 to 1927, using the Hill Dust Counter to measure the average number of dust particles per cubic foot in these cities. This varied from 17,600 dust particles per cubic foot in St. Louis to 5,360 dust particles for Boston.

Studying Air

HOWARD C. MURPHY

Relation of Dust to Health



A two-year study of air pollution in Akron (Ohio) public schools showed most illness in the wards with most dust in the air.

In 1929 I rechecked these conditions and found measurable improvement in many cities where intelligent and consistent supervision of the situation had been given. Reduction of dust content varied from one to 13 per cent.

Investigations in this country and abroad have shown a consistent relationship between the abnormal prevalence of respiratory infections and excessive pollution of city air.

The Akron (Ohio) school board made a study covering a period of two years as to the relationship between air pollution and sickness among school children. Records of the dust concentration in each ward were collected and tabulated, together with the number of school absentees and the pneumonia death rate. The results shown on the above chart are interesting in this connection.

Air filters are, of course, usually installed in the large central systems to remove soot and dirt, and the air-conditioning manufacturers were perhaps as much surprised as the users to find that these air filters were performing an incidental service of considerable value at certain seasons of the year. They had, in fact, created man-made hay fever resorts by removing pollens and other air-borne impurities which are the causative factors in seasonal hay fever and bronchial asthma.

Relieves Hay Fever

Newspaper dispatches from San Antonio stated that local sufferers escaped entirely their annual visitation of hay fever by remaining in their offices in an air-conditioned building day and night. Sufferers in many of our larger cities have learned to seek relief from their symptoms in public and semi-public buildings equipped wtih modern systems of air filtration. Usually the relief is immediate and grateful. Department stores, theaters, dining rooms and other enclosed places equipped with filtered air are a haven for the man with seasonal sneezes.

Dr. Siegfried Maurer, a Chicago physician who specializes in these disorders, conducted an investigation during the hay fever seasons in 1929 and 1930 and found that buildings equipped with air filters frequently have pollen counts which are less than one half of those found at several northern resorts to which hay fever sufferers go.

The Field Museum, for instance, he pronounced an unusually attractive place for hay fever sufferers. Of several public buildings in which Dr. Maurer made a count of ragweed pollen in the air over a period of time, Field Museum showed the lowest count. This building is equipped with air filters and Dr. Maurer states that the system of ventilation probably has much to do with the small quantity of pollen in the air, pointing out that on the days when observations were made the count seldom exceeded the remarkably low figure of 10 granules of pollen per cubic yard of air, whereas on these days in certain other Chicago buildings the count was from 10 to 20 times as many.

He continues, "I would recommend the Museum as a safe place for hay fever sufferers to spend the day in order that they may be in an atmosphere relatively free of pollen, and one in which most hay fever sufferers should become completely free of symptoms."

Obtains Low Pollen Count

He reports a total pollen count of 156 granules per cubic yard in 20 days in Field Museum. This compares with a count of 2,961 in 29 days in another large Chicago public building and 8,445 in 37 days at an outdoor observation station.

The air-conditioning plant installed in the U. S. Senate and House of Representatives at Washington has created a noticeable difference in the respiratory comfort of the occupants. Washingtonians have discovered they can expect definite relief from hay fever woes at the Capitol, even if some of their other problems go uncorrected.

There are more than 1,000,000 sufferers from hay fever in the United States. It has been conservatively estimated that the economic losses due to these disorders are in excess of $75,000,000 every year.

CHICAGO PUMP CO. NAMES WESTERN AGENT

CHICAGO—The Chicago Pump Co. has announced the appointment of T. H. Creears, Bendix building, Los Angeles, Calif., as its representative in that city.

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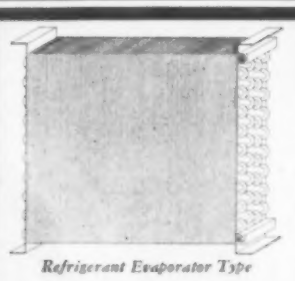

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Current Research in Air Conditioning

Gas Association Tests Air-Conditioning Systems Using Silica Gel

NEW YORK CITY—Two extensive experiments with air-conditioning systems using silica gel and operated by gas, were conducted last year by the research committee of the American Gas Association.

One system was installed in Chicago and the other in Pelham, N. Y. Operating performances were checked and a report made later at the annual meeting of the American Gas Association.

Working on the theory that six factors—heating, humidifying, cooling, dehumidifying, cleaning and circulating—contribute to year 'round air conditioning, the gas-fired systems were made to provide for all of these factors except dehumidifying and cooling, which were accomplished by the addition of silica gel units.

The silica gel units supply a slightly cooled dehumidified air to the space which is to be conditioned. A circulating fan maintains the movement of air through a circuit which includes the conditioned space, the silica gel unit, and the supply and return ducts.

By-Passed Over Silica Gel

A portion of the moisture-laden air returning from the conditioned space is by-passed through a silica gel dehumidifier and rejoins the main air stream, thus providing a mixture with a moisture content lower than that of the returned air.

The air is then propelled through an indirect water cooler which reduces its temperature slightly, and is distributed by the duct system to the space to be conditioned. A duct is equipped with a slide shutter, making it possible to draw in as much or as little outside air as may be found desirable.

The silica gel units work on the principle of the force of capillary attraction, in which a solid adsorbent is used.

Considering the pores of an ordinary sponge reduced to a billionth of their present diameter, the resulting infinitesimal pores would have capillary attraction such that they would drink in, not only water, but vapors, and under certain conditions, gases, holding them just as the sponge holds water.

Silica gel is a hard, glassy material with the appearance of clear quartz sand, made from sodium silicate and acid. Its chemical analysis is exactly the same as sand, silicon dioxide, but it differs in its highly porous structure, the pores of which cannot be seen because they are smaller than the wavelength of light.

Absorbing Powers

This gel will absorb 40 per cent of its own weight with no change in volume, if placed above water in a closed vessel. When heat is applied the water vapor will be driven out, a cycle which can go on indefinitely.

The silica gel system as developed by the research committee of the A.G.A. includes two beds of gel, one to take moisture out of the air being conditioned, while heat is driving out the moisture in the other in preparation for its air-drying cycle.

This reactivation or drying-out process is accomplished by the application of heat, which dries the bed by evaporation. A small gas furnace is used for this purpose. The products of combustion of this furnace are blown through the bed, drying it out and carrying the moisture up the flue.

When the bed has been thoroughly dried it is quite hot (210° F.), so that it must be cooled before it can be used. A closed circuit of air is used for cooling. The air is cooled by passing over coils of pipes through which city water is running and then is blown through the silica gel bed, returning to the cooling pipes. The same air is used over and over again for the cooling of the beds. Thus, it becomes very dry and does not affect the moisture-absorbing capacity of the reactivated bed.

The operation of the silica gel beds is completely automatic. For one hour a bed is in operation. At the end of that hour, an electric clock throws a switch which causes valves to close, diverting the air from the first bed to the second.

When these valves are set, a fan is put in motion which draws air through the gas furnace and blows it through the saturated bed. As this air reaches its maximum velocity the gas is automatically turned on and ignited. For the next 36 minutes the gas furnace is in operation, at the end of which time the gas is automatically turned off, water begins to circulate through the cooling pipes and the closed circuit of cooling air is put in motion. Cooling is accomplished in 24 min., so that it takes exactly an hour to dry and cool the bed. By that time the second bed has become saturated, and the process of drying and cooling is shifted to the second bed.

Air Must Be Cooled

A continuous flow of dry air is coming from the dehumidifying unit. It was warm when it entered the unit; the beds of silica gel are warm and add somewhat to the heat of the air; and finally, the process of extracting moisture from the air produces heat.

Therefore, the air must be cooled before it is delivered into the rooms. Furthermore, the dehumidifying unit is so efficient that it actually dries the air too much.

Air coming directly from the silica gel beds is too dry for comfort, and so it is diluted with inside air before passing through the cooler. This inside air has already been circulated through the house and is of a higher relative humidity than the treated air. The mixture first used on the Chicago installation consisted of about 10.5 per cent dry air and 89.5 per cent return air. Arrangements were made, however, to increase the percentage of dry air by decreasing the volume of inside air. The mixture is filtered to remove impurities and a blower-type fan then forces it through the cooling unit.

Air cooling is done separately from the drying operations, and may be done in three ways: (1) by a small reduction of dry-bulb temperature with tap water which is subsequently used to cool the gel beds after moisture is removed by heat; (2) by re-evaporating water into air whose moisture content has been greatly reduced by silica gel; and (3) by cooling with separate refrigerating machines.

Dallas, Tex., Installation

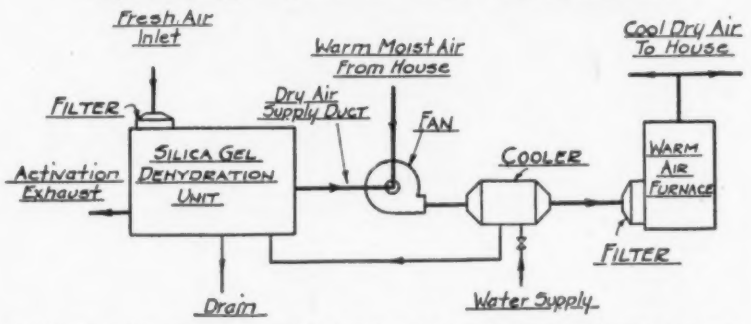
A third system, installed in Dallas, Tex., where the relative humidity is consistently low and the temperature high, utilized the silica gel system to supply air which had been cooled only.

The air is circulated as in the other system, the returning warm air, however, passing through an indirect water-vapor cooler and being distributed to the conditioned space. The silica gel unit in this case employs its absorbent properties for producing a water-vapor refrigerating cycle. The water from a condenser is expanded to a vapor in the coils of the water-vapor cooler.

The latent heat of evaporation is supplied from the air passing around the coils. The vapor passes from the cooler to the gel unit where it is absorbed, the action of absorption producing a partial vacuum which induces the mocoils of the water-vapor cooler.

The absorbed vapor is revaporized by the heat of steam in the coils imbedded in the gel and proceeds to a condenser, the condensation causing a vacuum which further induces the motion of the water vapor. From the condenser, water travels to the expanding coils. Steam is supplied by a gas-fired steam boiler. The condensing water is cooled in an evaporative cooler and reused.

Operating Cycle of Gas Conditioner



Beds of silica gel alternately dry the air, and are reactivated by gas.

NEW NIAGARA BLOWER AGENT

BUFFALO—The Niagara Blower Co. has announced the appointment of A. E. Edwards, 3622 E. Marginal Way, Seattle, as its Pacific coast representative. Offices will be established in Seattle and San Francisco.

UNIVERSITY CONDUCTS ICE COOLING TESTS

URBANA, Ill.—Research in cooling homes with ice equipment is being conducted this summer at the University of Illinois Research Residence by members of the university's department of mechanical engineering.

The studies were made possible by appropriations from the Illinois Association of Ice Industries and the Detroit Edison Co. to the American Society of Heating and Ventilating Engineers, which will sponsor the tests in conjunction with the National Warm Air Heating Association and other interested organizations.

At a meeting on May 17, three weeks after the Illinois Association of Ice Industries had made a $1,000 appropriation for the research project, members of the steering committee on summer cooling studies in the Research Residence met at Columbus to lay definite plans for conducting the work.

Having decided that the tentative program presented was too great in scope for one summer's work, the group adopted the program now being carried out.

The plan of procedure includes:

Tests with the entire residence cooled and the awnings in place and lowered.

Tests with unit coolers in individual rooms with the rest of the resience cooled by a central system, and with awnings in place and lowered.

The two tests cited above, but with awning removed.

Repeat tests while cooking operations are being carried on in the kitchen.

Tests on cooling the residence with an air washer, using several different water temperatures.

Tests with cool air from the basement, circulated by means of the duct distributing system.

Present at the meeting of the steering committee were F. G. Sedgwick and A. W. Williams of the N.W.A.H.A., A. W. Walker of the Detroit Edison Co., G. L. Larson and F. C. Houghton of the A.S.H.V.E., and A. C. Willard, S. Konzo, and A. P. Kratz of the University of Illinois.

The Research Residence, site of the summer's investigation, is owned by the National Warm Air Heating Association, and has been used for several years for research work in heating systems at the University of Illinois.

All expense incurred by the purchase of ice will be absorbed by the Illinois association, and will not be met by funds from the main appropriation.

HOLLAND CO. COMPLETES PHYSIOLOGICAL TESTS

CHICAGO—Two reports have just been issued by the Holland Research Laboratories on results of tests made to determine the physiological effects of air environment. The work is sponsored by the Holland Furnace Co. of Holland, Mich.

Report No. 1 gives data taken from tests to determine the best temperature for light work, while the second report discusses a "new comfort zone," based on the forehead temperature of nude subjects.

The Holland company is now preparing for an intensive investigation of the dust count in the air in industrial centers. Dr. E. Vernon Hill is in charge of the company's experimental work in air conditioning.

SUNSHINE PRESENTS CHIEF ROOM-COOLING PROBLEM

DETROIT—Sunshine through the window glass is the most important factor to contend with in air cooling, according to S. S. Sanford, sales engineer for the Detroit Edison Co.

"The importance of the sunshine factor is indicated by the fact that at times it may account for as much as 75 per cent of the total cooling load," he states.

Mr. Sanford has conducted an extensive series of tests with the air-conditioning system of the Union Guardian Building, a 40-story office building here, which has one of the most complete systems of air conditioning in the country.

He would recommend that cooling systems be zoned so that the side of the building on which the sun is shining can be controlled separately from the other sides of the building, and also that double windows be placed in buildings in which air-conditioning systems are to be installed.

AMERICAN AIR FILTER CO. REPORTS INDUSTRY TESTS

LOUISVILLE, Ky.—The American Air Filter Co. has recently issued a 26-page booklet, "American Air Filters in Industry," containing technical information on industrial dust problems.

Among the subjects covered are the use of filtered air for drying operations, the control of bacteria and mold spores, the cooling of electrical equipment, the control of process dust, and the protection of engines and compressors.

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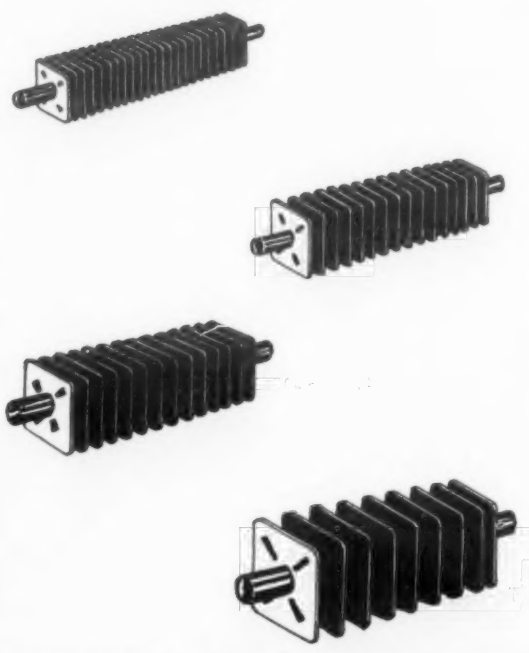
Remember—Bush Finned Tubing can be shipped in straight lengths, or fabricated into form to your specifications.

Inquiries regarding the application of Bush Products are solicited.

[Folder 100 N gives complete specifications]



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Simple Method of Estimating Air Cooling Loads

Traces Calculation of Refrigeration Needed for Typical Job

By G. C. Polk, Chief Engineer, American Blower Co., Detroit

INCREASED patronage during hot weather has brought a substantial return on the cost of providing comfortable atmospheric conditions in large theaters, stores, restaurants and the like. These large installations call for a considerable investment but have proved a paying proposition as climate control has been adopted at an increasing rate in the last few years.

It is only natural that smaller business places would observe the results of summer cooling and endeavor to bring these advantages to their particular houses. This desire on the part of small business owners and others, including office workers, to duplicate in their offices the same conditions maintained in their favorite theater or restaurant has been reflected in the new products offered by air conditioning manufacturers.

Many Types of Equipment

To meet a demand which has increased so rapidly, many different kinds of units are now available. Some are more elaborate than others and some are designed to perform certain functions not attempted by their competitors.

In selecting a unit to use for office, restaurant, store and other small room cooling, a decision should be made as to the amount of cooling desired, and a unit selected which will give that result. Cooling units should not be confused with ventilating units, and it should always be borne in mind that where heat is to be removed from the air, refrigeration must be used.

Refrigeration may be supplied by a refrigeration machine, by means of an ice-melting tank or from cold well water, if available in sufficient quantities. The use of the refrigeration machine is the most convenient method.

The Sirocco Series "O" Conditioner, illustrated in the upper right-hand picture on page 16, is installed under the window in an office. It is also suitable for retail store and restaurant installations. One or more units may be installed, depending on the size of the room.

May Replace Radiators

The units are usually located in the same position as steam radiators and may be used for heating in the winter as well as cooling in the summer, where desired.

Fig. 1 shows diagramatically how the units are connected to the refrigeration machine located in the basement. Refrigeration units are usually installed in basements or other convenient out-of-the-way places.

The refrigeration machine is equipped with a water tank in which the circulating water is cooled by the machine. This cooled water is then pumped to the various cooling units. One refrigeration machine may serve any number of units, the size of the machine depending on the number of units used.

Fig. 2 shows a cross section of the Sirocco Conditioner Series "O". This view shows an inner casing in which the fans are mounted on either end of the motor shaft and are attached to a cover plate which encloses the top of the inner casing. Just below the fans is shown the cooling coil through which the cold water circulates.

The water enters the cooling coil at one end through a special silencing valve which makes it possible to open the water flow any desired amount without any singing or whistling sound in the valve.

The water leaves the coil at the end opposite from that where it enters. Both the entering and leaving water pipes pass downward through the floor or to vertical risers. Under the cooling coil is located a cast-iron pan to catch all condensation forming on the cooling coil. All interior parts are galvanized or made rust-proof by other special processes.

Grille is Intake and Discharge

A separate outside casing is shown which covers not only the inside casing but also all the piping and electrical connections to the unit. In the top of this outer casing is shown a grille through which the fans discharge cold air upwards. This grille also acts as the air intake.

Air enters the unit through the top grille around its exterior and passes downward around the inner casing; just above the cast-iron drip pan the air turns and passes upward through the cooling coil to the fans and upward into the room.

The outside casing has a number of features. It provides a space which allows only room air to come in contact with this outside casing, thus preventing any condensation from forming on the exterior of this case. It takes the air into the unit at a higher level where the air may be slightly warmer and in that way increases the cooling efficiency of the unit.

The outside casing provides a well-finished exterior which may be retained in its original casing until the inner assembly has been entirely connected for use, or in the case of new buildings until all plastering, etc., has been completed.

Insulate Cold Water Pipes

The cold water pipes, both to and from the unit, should be covered with ice-water-thickness insulation carefully cemented in place to insure air not penetrating to the water pipes.

In order to select the proper size unit or units for an individual job it is necessary to first determine the heat load to be absorbed. For accurate figures this is determined in practically the same manner as that by which the heat load is calculated for winter heating, as outlined in the *1932 Guide* of the American Society of Heating and Ventialting Engineers.

However, very satisfactory selections can be arrived at by the use of the following emperical rules which will take care of the usual installations:

The function of the Series "O" Sirocco Conditioner is to absorb the heat being carried into a room from various sources and thereby lower the room temperature.

First Determine Heat Gain of Room

In order to determine the size and number of units required, the heat gain by the room must be established. The following figures may be used for quick calculations to establish the heat load with the temperature in the room approximately 10 degrees lower than the outside temperature:

1. Walls, floors, ceilings—4.5 B.t.u. per sq. ft. per hour.
2. Roof exposed to sun—12.0 B.t.u. per sq. ft. per hour.
3. Glass (not exposed to sun)—12.0 B.t.u. per sq. ft. per hour.
4. Glass (exposed to sun—west or south)—100.0 B.t.u. per sq. ft. per hour.
5. Glass (with awnings—south or west)—30.0 B.t.u. per sq. ft. per hour.
6. Occupants—450.0 B.t.u. per hour.
7. Electric light or power or heaters—3.5 B.t.u. per watt.
8. Infiltration—20.0 B.t.u. per 100 cu. ft. per hour.
9. Generally speaking, steam tables and the like should be hooded in order that their effect may be obviated entirely or reduced to a negligible quantity. Exhaust systems should be used to remove heat or moisture generated at the source. If there are any heat or moisture-producing elements not mentioned above they should be allowed for.

Takes an Example

Take for example a room 15 ft. wide, 30 ft. long and with a 15-ft. ceiling, 50 sq. ft. of glass exposed to the sun and 50 sq. ft. of glass not exposed, with roof exposed to sun and with five occupants. There are 400 watts of lights, and an exhaust fan provides for exhausting 300 cubic feet per minute or 18,000 cu. ft. per hour. The heat load would then be:

Walls—90x15=1350 minus 100 sq. ft. glass=1250 net wall area.

	B.t.u. per hour
Walls—1,250x4.5	5,625
Roof—30x15=450x4.5	2,025
Exposed glass—50 sq. ft. x 100	5,000
Unexposed glass—50 sq. ft. x 12	600
Occupants—5x450	2,250
Electric current—400 watts x 3.5	1,300
Infiltration—18,000 cu. ft. x 20	3,600
Total heat load	20,400

Table I shows the cooling capacity of Sirocco Series "O" Conditioners using 40° water for cooling. In using this method of estimating a cooling job, the number of units required should be selected from the horizontal lines No. 4 following the heading 80° D.B. and 66° W.B. This represents an average condition.

Referring to the above calculations then, which call for an absorption of 20,400 B.t.u. per hour, it will be seen that a No. 30 unit and a No. 45 unit combined, when operating at normal speed, will absorb 23,500 B.t.u. per hour under this condition. These two units would give satisfactory results under usual conditions.

Usual Reduction 10° F.

The actual temperature in the room will depend somewhat on the moisture conditions of the outside air, being lower when the humidity is not high and higher under extreme conditions of humidity. Under usual conditions these units would produce a temperature in the room approximately 10° F. lower than the outside temperature.

It should be borne in mind that in that part of the country where abnormally high external temperatures are encountered the occupant of a room is comfortable at temperatures of 80° F., but commences to become uncomfortable when the dry-bulb rises above 85° F. This should be taken into consideration in determining the heat load under these circumstances.

Selecting Refrigerating Machine

To select the refrigeration machine for these two units, divide their rated capacity by 12,000 to get the tonnage capacity of the refrigerating machine. In this case then 23,500÷12,000=1.96—use a 2-ton refrigerating machine. Table (4) also shows heating capacities of the Sirocco Series "O" Conditioner in order that proper selection may be made where they are to be used for heating in the winter as well as cooling in the summer.

Where exact cooling results are required and definite conditions must be produced in the room, the heat gain in the room must be calculated accurately by the use of the Psychrometric Chart and other data contained in the American Society of Heating and Ventilating Engineers *Guide* or which will be supplied by the American Blower Corporation; where quick estimates are required however, the method outlined above will give very good results.

Mechanical Installaiion

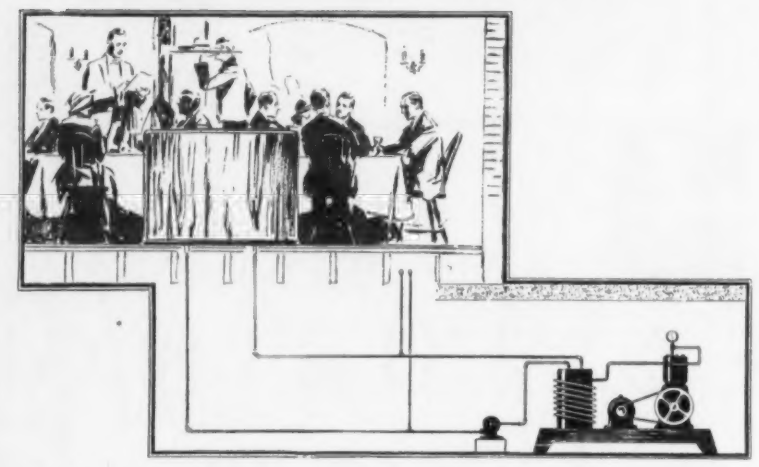


Fig. 1—Installed in the basement, the machine cools water for the coolers.

Cross Section of Conditioner

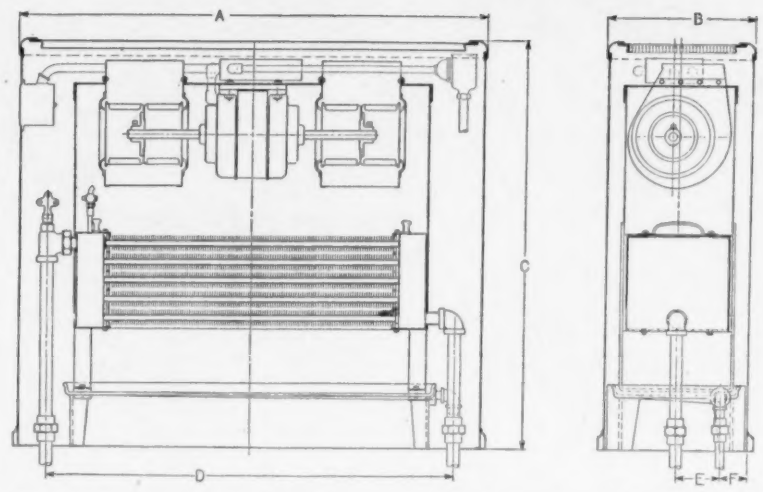


Fig. 2—Inner assembly showing cooling coils, fan, and vertical discharge.

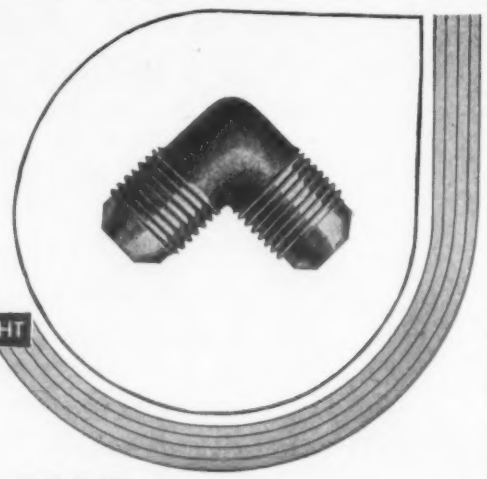
Table 1—Capacity of Cabinet Conditioners

Column	Entering Air Temp. Degrees F.	Entering Water Temp. Degrees F.	Speed	Cooling Capacity—B.t.u. per Hour Size 30	Size 45	Size 60	Size 75
1	80° DB 57° WB	40°	Min.	3,770	7,200	14,400	24,100
			Nor.	4,100	8,600	17,200	28,800
			Max.	4,400	10,000	20,000	33,500
2	80° DB 60° WB	40°	Min.	3,770	7,200	14,400	24,100
			Nor.	4,100	8,600	17,200	28,800
			Max.	4,400	10,000	20,000	33,500
3	80° DB 63° WB	40°	Min.	4,330	8,500	17,000	28,500
			Nor.	4,630	9,800	19,600	32,800
			Max.	4,930	11,100	22,200	37,250
4	80° DB 66° WB	40°	Min.	5,180	10,400	20,800	35,000
			Nor.	5,500	11,750	23,500	39,300
			Max.	5,800	13,100	26,200	44,000
5	80° DB 69° WB	40°	Min.	5,920	12,100	24,200	40,500
			Nor.	6,230	13,500	27,000	45,200
			Max.	6,530	14,900	29,800	50,000
6	80° DB 72° WB	40°	Min.	6,670	13,900	27,800	46,500
			Nor.	7,000	15,200	30,400	51,000
			Max.	7,300	16,500	33,000	55,200

Note: The above table is based on the following standard water quantities: No. 30 Conditioner—1.2 gals. per minute, or 600 lbs. per hour. No. 45 Conditioner—2.4 gals. per minute, or 1,200 lbs. per hour. No. 60 Conditioner—4.8 gals. per minute, or 2,400 lbs. per hour. No. 75 Conditioner—7.2 gals. per minute, or 3,600 lbs. per hour. If the water rate is increased 50 per cent add 5 per cent to B.t.u. values. If the water rate is increased 100 per cent add 8 per cent to B.t.u. values.

DISCUSS AIR CONDITIONING

BOSTON—"Air Conditioning, What It Is and How It Works" was the subject of a meeting held by the Metropolitan Electric League in the auditorium of the Edison Electrical Illuminating Co. here.



A VITAL POINT

ONE of the most vital points in automatic refrigerating systems is the fittings . . . it must give absolute proof against seepage of the refrigeration to ensure customer satisfaction.

Commonwealth Brass Seepage-Proof Fittings have, for 18 years, been the standard of perfection because they are "Built Right . . . To Stay Tight."

Commonwealth Fittings are made from hot forged brass or extruded rod, providing close granular structure . . . are accurately machined to S.A.E. No. 2 Standard . . . are 100 per cent inspected . . . and every tube seat is protected in shipment.

Prompt deliveries can be made from our comprehensive stock of standard fittings, as well as extra heavy and special fittings not available elsewhere.

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Send for our catalog No. 36 fully descriptive of our line of fittings carried in stock.

Artic
REG. U.S. PAT. OFF.
(R & H Methyl Chloride)
is an Ideal Refrigerant
for AIR CONDITIONING UNITS

THE efficient refrigerant for these units is one that can produce satisfactory conditioning with widely varying air temperatures, humidities, and volumes. That refrigerant is ARTIC.

Artic has a low volume displacement per unit of refrigeration, permitting the use of small equipment with low power consumption. Artic is not corrosive to ordinary equipment, even if moisture is present. It operates at positive pressures. It provides the quick cooling necessary for steady control and efficient operation.

Complete details about Artic are given in the new, revised and enlarged book "Artic—The Refrigerant." Copies sent free on request.

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Incorporated
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Universal Cooler Develops Data Sheet For Estimating Air-Conditioning Jobs

By William Higham
Air-Conditioning Engineer, Universal Cooler Corp.

IT has become necessary that refrigeration sales forces familiarize themselves with the requirements and technical information on air-conditioning work. The most important problem for the salesmen is to obtain the correct information and data on each air-conditioning proposal. In order to get away from the cumbersome methods and highly technical figuring on this type of installation, we have produced a sales sheet which is a simplified form.

The factors of heat-leak through walls of different constructions are shown. This factor is multiplied by the area of the wall. This sheet also takes care of heat transfer through single and double windows with sun radiation and without sun radiation. It indicates the heat gain from people at work and at rest along with the electric light load, gas ranges, etc.

Infiltration and fresh air load is figured on a percentage of the total load handled; and from actual experience, we find that 20 per cent of the total air handled will give a very close calculation for this heat gain.

To Calculate Tonnage

This has been simplified so that one need only multiply 20 per cent of the total air handled times the average weight of the air times differential in the total heat, assuming 95° F. outside air and 75° F. inside air. These figures are then totaled at the bottom of the sheet and divided by 12,000 to obtain the tonnage required.

We are showing below the specific installation indicating the heat losses through the various parts of the building and the heat gain from electric lights, etc. The total tonnage on this particular installation is 2.52.

Five Changes Per Hour

This building has a total volume of approximately 2,500 cu. ft. Five complete air changes were figured per hour which necessitates the handling of 12,500 cu. ft. per hour. Twenty per cent of this value is equal to 2,500 cu. ft. per hour, which in turn is used for the heat gain through infiltration shown at the bottom of the sheet.

In the next column are recommendations for figuring the required amount of air based on various changes per hour.

Specification Sheet for Installations

Prospect: *John Doe.* Date: *Aug. 1, 1932.* Type of Business: *Restaurant.*
Street: *Woodward Ave.* City: *Detroit.* State: *Michigan.*
Room Dimensions: Wide *18 ft. 4 in.* Long *19 ft. 4 in.* High *7 ft.*

Sq. Ft. of Wall Surface for:				B.t.u. Per Hr.
Plain Brick Wall		Sq. Ft. x	7.3=	
Brick Wall + Air Space Furred and Plastered		Sq. Ft. x	4.3=	
Wood Wall or Floor	766	Sq. Ft. x	4.0=	3,064
Hollow Tile ½-in. Plaster Both Sides	140	Sq. Ft. x	5.6=	785
Concrete (6 in. Thick)		Sq. Ft. x	11.3=	
Roof: Hollow Terra-Cotta Tile 3-in. Thick with 5-ply Tar and Felts	400	Sq. Ft. x	20.8=	8,340
Windows (No Sun Radiation) Single	96	Sq. Ft. x	22.5=	2,160
Double		Sq. Ft. x	9.0=	
Windows (With Sun Radiation) Single	48	Sq. Ft. x	143.0=	6,870
Double		Sq. Ft. x	58.5=	
Heat Load for People Men at Rest	8	(No.) x	400.0=	3,200
Men at Work		(No.) x	500.0=	
Electric Lights No. of Lights x Watts per Lamp x 3.415		300x3.415=		1,003
Heat Load for Gas Ranges Producer Gas		Cu. Ft. x	150=	
Illuminating Gas		Cu. Ft. x	700=	
Natural Gas		Cu. Ft. x	1,000=	

(Average Gas consumption per burner= 5 cu. ft. per hour)
Fresh Air Load Not to Exceed 20% of total air handled.
No Cu. Ft. per hour 2,500 x .075 x 26.0= 4,875
Total =30,297
Total Refrigeration= Total B.t.u. per Hour ÷ 12,000= 2.52 Tons
Available Current: AC or DC *AC* Volts *230* Amperes .....
Available Water: Size of Meter *2-in. Line*

Universal Cooler's method of estimating loads. See adjoining article.

	Changes Per Hour
Restaurant	5 to 6
Ice Cream Parlor	4 to 5
Offices	3 to 5
Locker Rooms	2 to 3
Funeral Parlors	3 to 5
Hallways	1 to 2

The formula for figuring the total air handled based on required changes per hour is:

L=Number of changes x J
Where L=Required volume of air per hr.
J=Total cubical content

As per example in previous problem:
L=5J or 12,500 cu. ft.

Further requirements are:

1. Maximum air outlets at any one discharge should not exceed 350 ft. per minute.
2. Air discharge grilles should be approximately 7 to 8 ft. above floor level.
3. All suction return grilles should be on floor level or on the side base panel.
4. Recommended grilles (Detroit) "Uni-Flo."
5. Use, whenever possible, three-phase circuits for the refrigeration motors. There is a decided advantage of overall efficiency of the unit which will materially reduce power consumption.

(a). All surveys should contain the direction the building faces which information is used in obtaining the exact sun exposure load.

(b). Where the enclosure to be conditioned has a roof exposure, the construction of the roof is a very important item and must be included in the survey.

DETROIT CAFETERIA BUYS FRIGIDAIRE CONDITIONERS

DETROIT—Now in his eighteenth year in the restaurant business, T. R. Kartsen, manager of Kartsen's Kafeteria here, has had his cafeteria equipped with a Frigidaire air-conditioning system which produces 13 tons of refrigeration per hrs. The installation was completed about a month ago.

The installation was made, says Mr. Kartsen, because he "was confident it would increase his patronage."

Thirteen 1-ton, water-cooled compressors are installed on the mezzanine floor, the restaurant being on the second floor of a Detroit building. The 13 cooling units are of the suspended type, and are placed on walls and columns throughout the large room. F-12 is the refrigerant used.

Each of the units operates as a separate system, and may be operated or cut off by a switch at the will of the manager. Every unit being operated is automatically regulated by a thermostat in the cooling unit.

The system keeps the temperature of the room approximately 10° below street temperature, and so dehumidifies the air as to keep it constantly in the comfort zone.

Mr. Kartsen estimates that the cost of operating the system is 20 cents per hr.

BAKER EQUIPMENT COOLS COFFEE SHOP IN OMAHA

OMAHA—The coffee shop of the Hill Hotel here, has just been equipped with a Baker air-conditioning system which will cool, filter, circulate, and dehumidify the air in the room.

The room contains approximately 21,000 sq. ft. The air-conditioning equipment supplies 3,400 cu. ft. of fresh air per minute. The compressor used is a model 6-A, operating at 460 r.p.m. and 55 lbs. suction pressure. The refrigerating unit is automatically controlled. A Buffalo Forge floor-type cooler is used.

HOUSE INSULATION TREATED IN GOVERNMENT BOOK

WASHINGTON, D. C.—The application of insulating materials to residential construction, particularly with reference to making air-conditioning equipment function more efficiently, is treated in a pamphlet, "House Insulation; Its Economics and Application," put out by the National Committee on Wood Utilization of the Department of Commerce.

The booklet also considers the uses of insulation in refrigerator cars, passenger automobiles, airplanes, milk containers, etc.

DEMET AIR COOLS STORES BY COPELAND EQUIPMENT

CHICAGO—DeMet's candy stores, tea rooms and restaurants, known throughout Chicago since 1920, have installed Copeland room-cooling equipment in eight of their stores, according to George DeMet.

Last summer the hottest and smallest, as well as one of the busiest stores of the chain, located at the corner of State and Madison, was air conditioned to try the efficiency of the equipment.

"In connection with this particular tea room we have a candy department for the retail sale of our confections," said Mr. DeMet. "Heretofore we have had considerable trouble in keeping chocolates in the showcases during the warm days, but since the installation of the room coolers our chocolates throughout the warmest days were just as fresh and solid as they were in our ice boxes at the commissary where they are stored immediately after they are made."

This was only an incidental benefit, Mr. DeMet pointed out, as the equipment was originally installed to add to the comfort of patrons of the shop, but it was not a week until it was noticed that the usual losses from melted chocolates had stopped.

"We are convinced that room cooling for summertime is a necessity just as a heating system is for winter."

designing
DOORSEALS
?

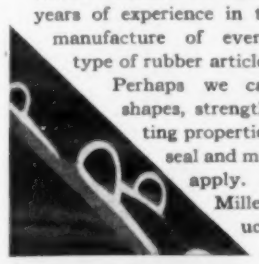
no one
knows
rubber like
MILLER

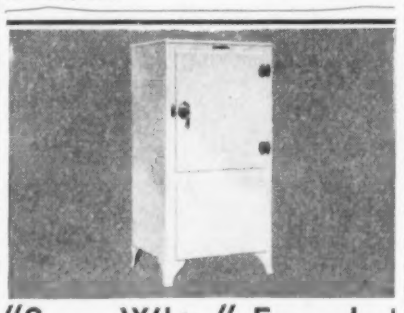
THE young electric refrigerator industry, like all other infant industries, made some mistakes in its first models.

But doorseal, from the very beginning, did a good job, and we are proud of the fact that we were able to help.

Engineers asked us to collaborate in the early days—and they still ask our advice—because we have had so many years of experience in the design and manufacture of every conceivable type of rubber article.

Perhaps we can better the shapes, strengthen the insulating properties in your doorseal and make it easier to apply. Address, The Miller Rubber Products Co., (Inc.), Akron, Ohio.





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Refrigerator Cabinets

Thoroughly and efficiently insulated, rigid in construction and beautiful in appearance. Prompt delivery in standard models and sizes of 4, 5, 6 and 7 feet, for both upper or lower unit mounting. Chromium finished hardware of artistic design. Equipped to produce special models at lowest prices when quantity is attractive.

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Estimates on request

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HARD RUBBER EQUIPMENT FOR REFRIGERATED DISPLAY CABINETS
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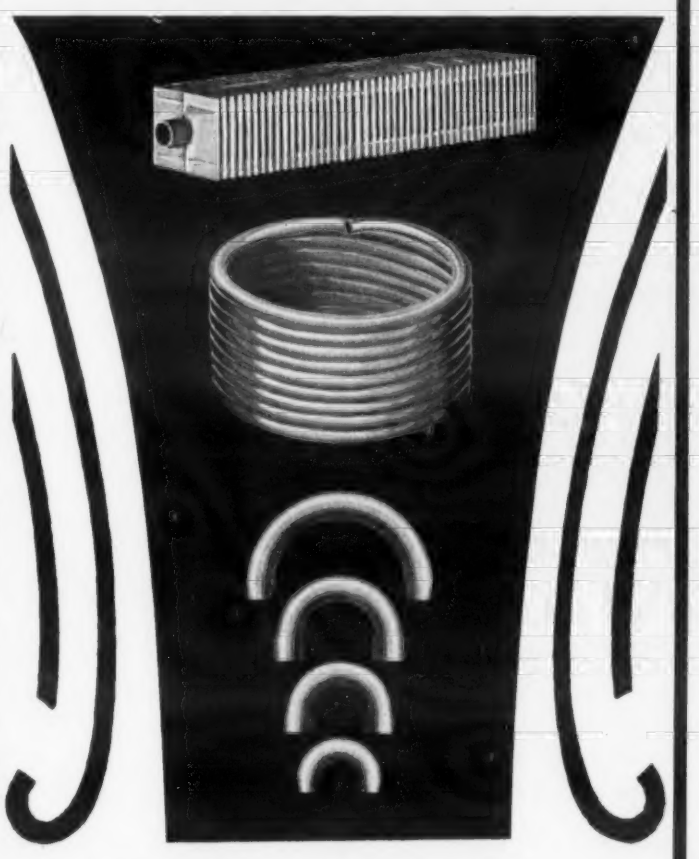
WOLVERINE
Seamless Copper Tubing *For All* Air Conditioning Equipment



Coils, Bends,
Fin Tubing,
Fabricated Parts

FOR many years Wolverine has been the standard in the Electric Refrigeration and Heating industries. Now we stand ready to serve the Air Conditioning industry whenever and wherever the absolute quality of Wolverine Seamless Tubing can be used. In producing plain or fin tubing in any quantity, the Wolverine organization will meet you more than half way with quality, service and economy. Wire, telephone or write to any Wolverine office.

Always Prompt Shipments
Large Stocks Ready

Refrigeration Tubing

Immediate delivery of 25, 50 and 100 ft.
Sealed Dehydrated Coils. Plain or Tin Plated

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Simple Method of Estimating Air Cooling Loads

Traces Calculation of Refrigeration Needed for Typical Job

By G. C. Polk, Chief Engineer, American Blower Co., Detroit

INCREASED patronage during hot weather has brought a substantial return on the cost of providing comfortable atmospheric conditions in large theaters, stores, restaurants and the like. These large installations call for a considerable investment but have proved a paying proposition as climate control has been adopted at an increasing rate in the last few years.

It is only natural that smaller business places would observe the results of summer cooling and endeavor to bring these advantages to their particular houses. This desire on the part of small business owners and others, including office workers, to duplicate in their offices the same conditions maintained in their favorite theater or restaurant has been reflected in the new products offered by air conditioning manufacturers.

Many Types of Equipment

To meet a demand which has increased so rapidly, many different kinds of units are now available. Some are more elaborate than others and some are designed to perform certain functions not attempted by their competitors.

In selecting a unit to use for office, restaurant, store and other small room cooling, a decision should be made as to the amount of cooling desired, and a unit selected which will give that result. Cooling units should not be confused with ventilating units, and it should always be borne in mind that where heat is to be removed from the air, refrigeration must be used.

Refrigeration may be supplied by a refrigeration machine, by means of an ice-melting tank or from cold well water, if available in sufficient quantities. The use of the refrigeration machine is the most convenient method.

The Sirocco Series "O" Conditioner, illustrated in the upper right-hand picture on page 16, is installed under the window in an office. It is also suitable for retail store and restaurant installations. One or more units may be installed, depending on the size of the room.

May Replace Radiators

The units are usually located in the same position as steam radiators and may be used for heating in the winter as well as cooling in the summer, where desired.

Fig. 1 shows diagramatically how the units are connected to the refrigeration machine located in the basement. Refrigeration units are usually installed in basements or other convenient out-of-the-way places.

The refrigeration machine is equipped with a water tank in which the circulating water is cooled by the machine. This cooled water is then pumped to the various cooling units. One refrigeration machine may serve any number of units, the size of the machine depending on the number of units used.

Fig. 2 shows a cross section of the Sirocco Conditioner Series "O". This view shows an inner casing in which the fans are mounted on either end of the motor shaft and are attached to a cover plate which encloses the top of the inner casing. Just below the fans is shown the cooling coil through which the cold water circulates.

The water enters the cooling coil at one end through a special silencing valve which makes it possible to open the water flow any desired amount without any singing or whistling sound in the valve.

The water leaves the coil at the end opposite from that where it enters. Both the entering and leaving water pipes pass downward through the floor or to vertical risers. Under the cooling coil is located a cast-iron pan to catch all condensation forming on the cooling coil. All interior parts are galvanized or made rust-proof by other special processes.

Grille is Intake and Discharge

A separate outside casing is shown which covers not only the inside casing but also all the piping and electrical connections to the unit. In the top of this outer casing is shown a grille through which the fans discharge cold air upwards. This grille also acts as the air intake.

Air enters the unit through the top grille around its exterior and passes downward around the inner casing; just above the cast-iron drip pan the air turns and passes upward through the cooling coil to the fans and upward into the room.

The outside casing has a number of features. It provides a space which allows only room air to come in contact with this outside casing, thus preventing any condensation from forming on the exterior of this case. It takes the air into the unit at a higher level where the air may be slightly warmer and in that way increases the cooling efficiency of the unit.

The outside casing provides a well-finished exterior which may be retained in its original casing until the inner assembly has been entirely connected for use, or in the case of new buildings until all plastering, etc., has been completed.

Insulate Cold Water Pipes

The cold water pipes, both to and from the unit, should be covered with ice-water-thickness insulation carefully cemented in place to insure air not penetrating to the water pipes.

In order to select the proper size unit or units for an individual job it is necessary to first determine the heat load to be absorbed. For accurate figures this is determined in practically the same manner as that by which the heat load is calculated for winter heating, as outlined in the *1932 Guide* of the American Society of Heating and Ventialting Engineers.

However, very satisfactory selections can be arrived at by the use of the following emperical rules which will take care of the usual installations:

The function of the Series "O" Sirocco Conditioner is to absorb the heat being carried into a room from various sources and thereby lower the room temperature.

First Determine Heat Gain of Room

In order to determine the size and number of units required, the heat gain by the room must be established. The following figures may be used for quick calculations to establish the heat load with the temperature in the room approximately 10 degrees lower than the outside temperature:

1. Walls, floors, ceilings—4.5 B.t.u. per sq. ft. per hour.
2. Roof exposed to sun—12.0 B.t.u. per sq. ft. per hour.
3. Glass (not exposed to sun)—12.0 B.t.u. per sq. ft. per hour.
4. Glass (exposed to sun—west or south)—100.0 B.t.u. per sq. ft. per hour.
5. Glass (with awnings—south or west)—30.0 B.t.u. per sq. ft. per hour.
6. Occupants—450.0 B.t.u. per hour.
7. Electric light or power or heaters—3.5 B.t.u. per watt.
8. Infiltration—20.0 B.t.u. per 100 cu. ft. per hour.
9. Generally speaking, steam tables and the like should be hooded in order that their effect may be obviated entirely or reduced to a negligible quantity. Exhaust systems should be used to remove heat or moisture generated at the source. If there are any heat or moisture-producing elements not mentioned above they should be allowed for.

Takes an Example

Take for example a room 15 ft. wide, 30 ft. long and with a 15-ft. ceiling, 50 sq. ft. of glass exposed to the sun and 50 sq. ft. of glass not exposed, with roof exposed to sun and with five occupants. There are 400 watts of lights, and an exhaust fan provides for exhausting 300 cubic feet per minute or 18,000 cu. ft. per hour. The heat load would then be:

Walls—90x15=1350 minus 100 sq. ft. glass=1250 net wall area.

	B.t.u. per hour
Walls—1,250x4.5	5,625
Roof—30x15=450x4.5	2,025
Exposed glass—50 sq. ft. x 100	5,000
Unexposed glass—50 sq. ft. x 12	600
Occupants—5x450	2,250
Electric current—400 watts x 3.5	1,300
Infiltration—18,000 cu. ft. x 20	3,600
Total heat load	20,400

Table I shows the cooling capacity of Sirocco Series "O" Conditioners using 40° water for cooling. In using this method of estimating a cooling job, the number of units required should be selected from the horizontal lines No. 4 following the heading 80° D.B. and 66° W.B. This represents an average condition.

Referring to the above calculations then, which call for an absorption of 20,400 B.t.u. per hour, it will be seen that a No. 30 unit and a No. 45 unit combined, when operating at normal speed, will absorb 23,500 B.t.u. per hour under this condition. These two units would give satisfactory results under usual conditions.

Usual Reduction 10° F.

The actual temperature in the room will depend somewhat on the moisture conditions of the outside air, being lower when the humidity is not high and higher under extreme conditions of humidity. Under usual conditions these units would produce a temperature in the room approximately 10° F. lower than the outside temperature.

It should be borne in mind that in that part of the country where abnormally high external temperatures are encountered the occupant of a room is comfortable at temperatures of 80° F., but commences to become uncomfortable when the dry-bulb rises above 85° F. This should be taken into consideration in determining the heat load under these circumstances.

Selecting Refrigerating Machine

To select the refrigeration machine for these two units, divide their rated capacity by 12,000 to get the tonnage capacity of the refrigerating machine. In this case then 23,500÷12,000=1.96—use a 2-ton refrigerating machine. Table (4) also shows heating capacities of the Sirocco Series "O" Conditioner in order that proper selection may be made where they are to be used for heating in the winter as well as cooling in the summer.

Where exact cooling results are required and definite conditions must be produced in the room, the heat gain in the room must be calculated accurately by the use of the Psychrometric Chart and other data contained in the American Society of Heating and Ventialting Engineers *Guide* or which will be supplied by the American Blower Corporation; where quick estimates are required however, the method outlined above will give very good results.

Mechanical Installaiion

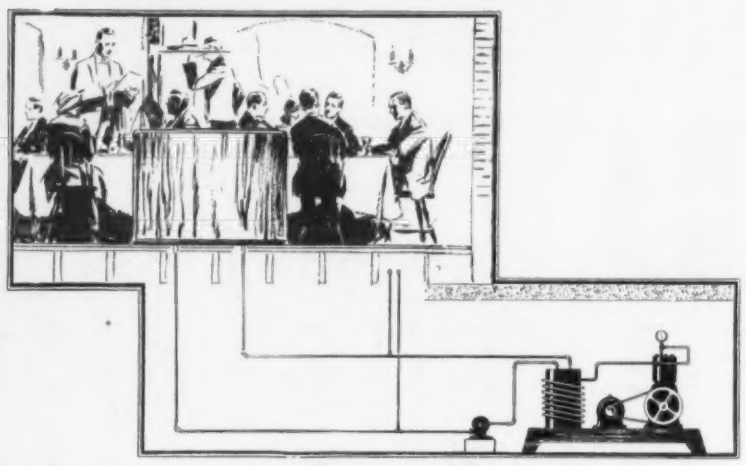

Fig. 1—Installed in the basement, the machine cools water for the coolers.

Cross Section of Conditioner

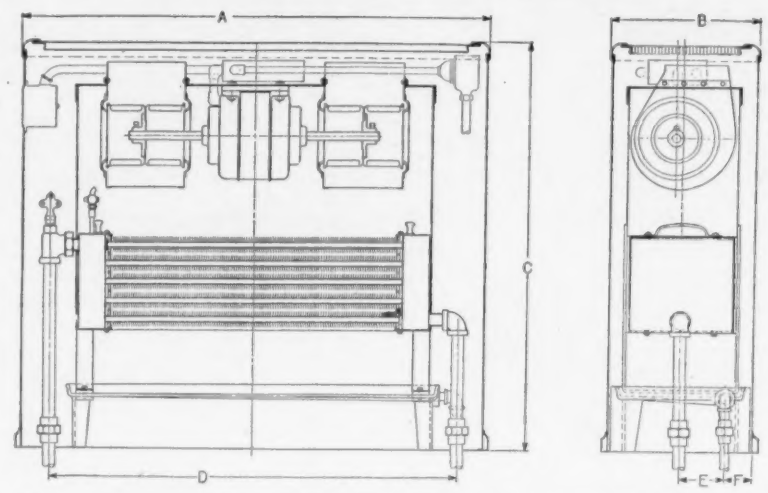

Fig. 2—Inner assembly showing cooling coils, fan, and vertical discharge.

Table 1—Capacity of Cabinet Conditioners

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			Nor.	4,100	8,600	17,200	28,800
			Max.	4,400	10,000	20,000	33,500
2	80° DB 60° WB	40°	Min.	3,770	7,200	14,400	24,100
			Nor.	4,100	8,600	17,200	28,800
			Max.	4,400	10,000	20,000	33,500
3	80° DB 63° WB	40°	Min.	4,330	8,500	17,000	28,500
			Nor.	4,630	9,800	19,600	32,800
			Max.	4,930	11,100	22,200	37,250
4	80° DB 66° WB	40°	Min.	5,180	10,400	20,800	35,000
			Nor.	5,500	11,750	23,500	39,300
			Max.	5,800	13,100	26,200	44,000
5	80° DB 69° WB	40°	Min.	5,920	12,100	24,200	40,500
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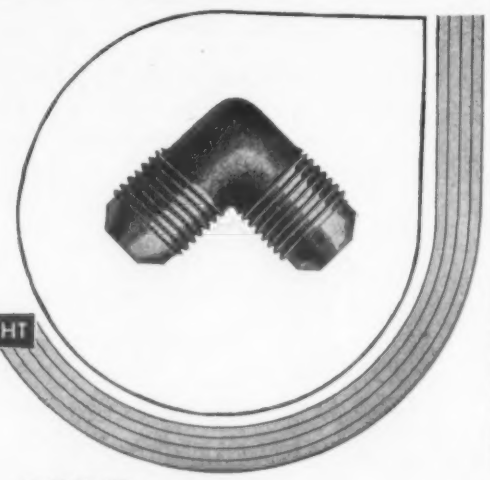
			Max.	6,530	14,900	29,800	50,000
6	80° DB 72° WB	40°	Min.	6,670	13,900	27,800	46,500
			Nor.	7,000	15,200	30,400	51,000
			Max.	7,300	16,500	33,000	55,200

Note: The above table is based on the following standard water quantities: No. 30 Conditioner—1.2 gals. per minute, or 600 lbs. per hour. No. 45 Conditioner—2.4 gals. per minute, or 1,200 lbs. per hour. No. 60 Conditioner—4.8 gals. per minute, or 2,400 lbs. per hour. No. 75 Conditioner—7.2 gals. per minute, or 3,600 lbs. per hour. If the water rate is increased 50 per cent add 5 per cent to B.t.u. values. If the water rate is increased 100 per cent add 8 per cent to B.t.u. values.

DISCUSS AIR CONDITIONING

BOSTON—"Air Conditioning, What It Is and How It Works" was the subject of a meeting held by the Metropolitan Electric League in the auditorium of the Edison Electrical Illuminating Co. here.



BUILT RIGHT—TO STAY TIGHT

A VITAL POINT

ONE of the most vital points in automatic refrigerating systems is the fittings . . . it must give absolute proof against seepage of the refrigeration to ensure customer satisfaction.

Commonwealth Brass Seepage-Proof Fittings have, for 18 years, been the standard of perfection because they are "Built Right . . . To Stay Tight."

Commonwealth Fittings are made from hot forged brass or extruded rod, providing close granular structure . . . are accurately machined to S.A.E. No. 2 Standard . . . are 100 per cent inspected . . . and every tube seat is protected in shipment.

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for AIR CONDITIONING UNITS

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Complete details about Artic are given in the new, revised and enlarged book "Artic—The Refrigerant." Copies sent free on request.

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Incorporated
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Universal Cooler Develops Data Sheet For Estimating Air-Conditioning Jobs

By William Higham
Air-Conditioning Engineer, Universal Cooler Corp.

IT has become necessary that refrigeration sales forces familiarize themselves with the requirements and technical information on air-conditioning work. The most important problem for the salesmen is to obtain the correct information and data on each air-conditioning proposal. In order to get away from the cumbersome methods and highly technical figuring on this type of installation, we have produced a sales sheet which is a simplified form.

The factors of heat-leak through walls of different constructions are shown. This factor is multiplied by the area of the wall. This sheet also takes care of heat transfer through single and double windows with sun radiation and without sun radiation. It indicates the heat gain from people at work and at rest along with the electric light load, gas ranges, etc.

Infiltration and fresh air load is figured on a percentage of the total load handled; and from actual experience, we find that 20 per cent of the total air handled will give a very close calculation for this heat gain.

To Calculate Tonnage

This has been simplified so that one need only multiply 20 per cent of the total air handled times the average weight of the air times differential in the total heat, assuming 95° F. outside air and 75° F. inside air. These figures are then totaled at the bottom of the sheet and divided by 12,000 to obtain the tonnage required.

We are showing below the specific installation indicating the heat losses through the various parts of the building and the heat gain from electric lights, etc. The total tonnage on this particular installation is 2.52.

Five Changes Per Hour

This building has a total volume of approximately 2,500 cu. ft. Five complete air changes were figured per hour which necessitates the handling of 12,500 cu. ft. per hour. Twenty per cent of this value is equal to 2,500 cu. ft. per hour, which in turn is used for the heat gain through infiltration shown at the bottom of the sheet.

In the next column are recommendations for figuring the required amount of air based on various changes per hour.

Specification Sheet for Installations

Prospect: *John Doe.* Date: *Aug. 1, 1932.* Type of Business: *Restaurant.*
Street: *Woodward Ave.* City: *Detroit.* State: *Michigan.*
Room Dimensions: Wide *18 ft. 4 in.* Long *19 ft. 4 in.* High *7 ft.*

Sq. Ft. of Wall Surface for:			B.t.u. Per Hr.
Plain Brick Wall	Sq. Ft.	x 7.3=	
Brick Wall + Air Space		=	
Furred and Plastered	Sq. Ft.	x 4.3=	
Wood Wall or Floor	766 Sq. Ft.	x 4.0=	3,064
Hollow Tile ½-in. Plaster Both Sides	140 Sq. Ft.	x 5.6=	785
Concrete (6 in. Thick)	Sq. Ft.	x 11.3=	
Roof: Hollow Terra-Cotta Tile			
3-in. Thick with 5-ply Tar and Felts	400 Sq. Ft.	x 20.8=	8,340
Windows (No Sun Radiation)			
Single	96 Sq. Ft.	x 22.5=	2,160
Double	Sq. Ft.	x 9.0=	
Windows (With Sun Radiation)			
Single	48 Sq. Ft.	x 143.0=	6,870
Double	Sq. Ft.	x 58.5=	
Heat Load for People			
Men at Rest	8 (No.)	x 400.0=	3,200
Men at Work	(No.)	x 500.0=	
Electric Lights			
No. of Lights x Watts per Lamp x 3.415		300x3.415=	1,003
Heat Load for Gas Ranges			
Producer Gas	Cu. Ft.	x 150=	
Illuminating Gas	Cu. Ft.	x 700=	
Natural Gas	Cu. Ft.	x 1,000=	
(Average Gas consumption per burner= 5 cu. ft. per hour)			
Fresh Air Load Not to Exceed 20% of total air handled.			
No Cu. Ft. per hour	2,500	x .075 x 26.0=	4,875
Total			=30,297

Total Refrigeration= Total B.t.u. per Hour ÷ 12,000= 2.52 Tons
Available Current: AC or DC *AC* Volts *230* Amperes .....
Available Water: Size of Meter *2-in. Line*

Universal Cooler's method of estimating loads. See adjoining article.

	Changes Per Hour
Restaurant	5 to 6
Ice Cream Parlor	4 to 5
Offices	3 to 5
Locker Rooms	2 to 3
Funeral Parlors	3 to 5
Hallways	1 to 2

The formula for figuring the total air handled based on required changes per hour is:

L=Number of changes x J
Where L=Required volume of air per hr.
J=Total cubical content

As per example in previous problem:
L=5J or 12,500 cu. ft.

Further requirements are:

1. Maximum air outlets at any one discharge should not exceed 350 ft. per minute.
2. Air discharge grilles should be approximately 7 to 8 ft. above floor level.
3. All suction return grilles should be on floor level or on the side base panel.
4. Recommended grilles (Detroit) "Uni-Flo."
5. Use, whenever possible, three-phase circuits for the refrigeration motors. There is a decided advantage of overall efficiency of the unit which will materially reduce power consumption.

(a). All surveys should contain the direction the building faces which information is used in obtaining the exact sun exposure load.

(b). Where the enclosure to be conditioned has a roof exposure, the construction of the roof is a very important item and must be included in the survey.

DETROIT CAFETERIA BUYS FRIGIDAIRE CONDITIONERS

DETROIT—Now in his eighteenth year in the restaurant business, T. R. Kartsen, manager of Kartsen's Kafeteria here, has had his cafeteria equipped with a Frigidaire air-conditioning system which produces 13 tons of refrigeration per hrs. The installation was completed about a month ago.

The installation was made, says Mr. Kartsen, because he "was confident it would increase his patronage."

Thirteen 1-ton, water-cooled compressors are installed on the mezzanine floor, the restaurant being on the second floor of a Detroit building. The 13 cooling units are of the suspended type, and are placed on walls and columns throughout the large room. F-12 is the refrigerant used.

Each of the units operates as a separate system, and may be operated or cut off by a switch at the will of the manager. Every unit being operated is automatically regulated by a thermostat in the cooling unit.

The system keeps the temperature of the room approximately 10° below street temperature, and so dehumidifies the air as to keep it constantly in the comfort zone.

Mr. Kartsen estimates that the cost of operating the system is 20 cents per hr.

BAKER EQUIPMENT COOLS COFFEE SHOP IN OMAHA

OMAHA—The coffee shop of the Hill Hotel here, has just been equipped with a Baker air-conditioning system which will cool, filter, circulate, and dehumidify the air in the room.

The room contains approximately 21,000 sq. ft. The air-conditioning equipment supplies 3,400 cu. ft. of fresh air per minute. The compressor used is a model 6-A, operating at 460 r.p.m. and 55 lbs. suction pressure. The refrigerating unit is automatically controlled. A Buffalo Forge floor-type cooler is used.

HOUSE INSULATION TREATED IN GOVERNMENT BOOK

WASHINGTON, D. C.—The application of insulating materials to residential construction, particularly with reference to making air-conditioning equipment function more efficiently, is treated in a pamphlet, "House Insulation; Its Economics and Application," put out by the National Committee on Wood Utilization of the Department of Commerce.

The booklet also considers the uses of insulation in refrigerator cars, passenger automobiles, airplanes, milk containers, etc.

DEMET AIR COOLS STORES BY COPELAND EQUIPMENT

CHICAGO—DeMet's candy stores, tea rooms and restaurants, known throughout Chicago since 1920, have installed Copeland room-cooling equipment in eight of their stores, according to George DeMet.

Last summer the hottest and smallest, as well as one of the busiest stores of the chain, located at the corner of State and Madison, was air conditioned to try the efficiency of the equipment.

"In connection with this particular tea room we have a candy department for the retail sale of our confections," said Mr. DeMet. "Heretofore we have had considerable trouble in keeping chocolates in the showcases during the warm days, but since the installation of the room coolers our chocolates throughout the warmest days were just as fresh and solid as they were in our ice boxes at the commissary where they are stored immediately after they are made."

This was only an incidental benefit, Mr. DeMet pointed out, as the equipment was originally installed to add to the comfort of patrons of the shop, but it was not a week until it was noticed that the usual losses from melted chocolates had stopped.

"We are convinced that room cooling for summertime is a necessity just as a heating system is for winter."

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rubber like
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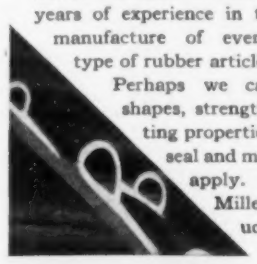

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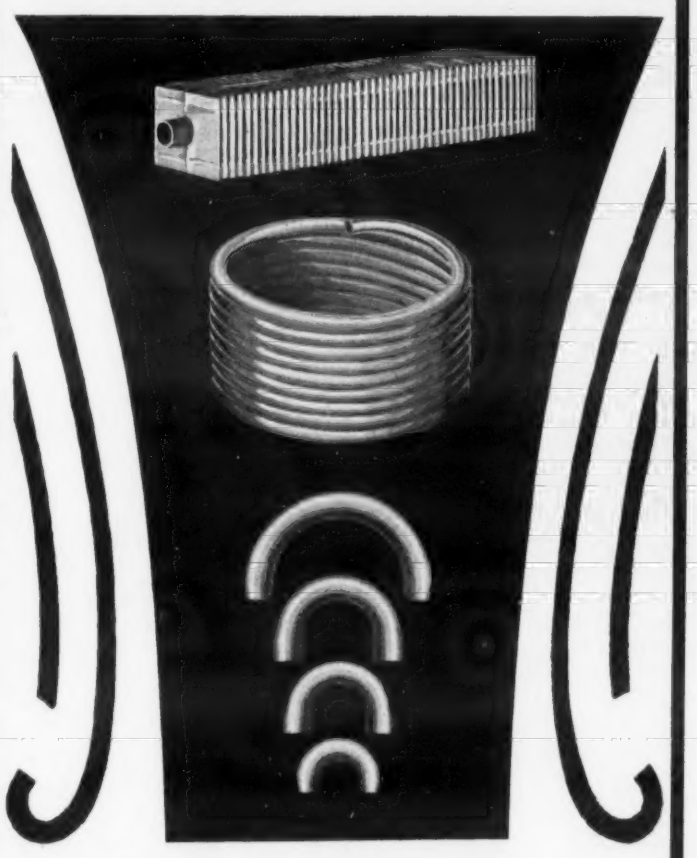

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OFF-PERIOD CAPACITY ADDED BY MAKING ICE

By John T. Schaefer

CHICAGO—By designing a water-cooling tank in which ice is alternately frozen and melted, W. D. Jordan, president of Air-Control Systems, Inc., has evolved a method of storing refrigeration capacity in the form of ice so that practically a full day's production of a refrigerating machine can be dissipated in several hours by the "Zephyr" air-conditioning cabinets which his company manufactures.

The system permits the use of refrigerating equipment with much smaller capacity than the air-cooling capacity of the cooling units, since the refrigerating machine may operate for 24 hours, and the air-cooling equipment only 8 or 10 hours a day.

To illustrate the operation of the ice tank, Mr. Jordan cites an example of a retail store with a heat load of 36,000 B.t.u. per hour.

"This would require the installation of three tons of air-cooling units, and a load of three tons of refrigeration for eight hours a day.

"Instead of requiring three 1-ton condensing units, or one 3-ton condensing units, the load can be carried by one 1-ton machine with the ice storage tank, because during the 16-hour off period, approximately 1,500 lbs. of ice can be frozen, and during the 8-hour on period, the combined capacity of the compressor, and the melting of the ice will provide three tons of capacity," Mr. Jordan claims.

The Zephyr air-conditioning unit is housed in a 32¼x24x12¾-in. cabinet and is designed for one ton of summer cooling, with a finely atomized spray of refrigerated water forced through an orifice at a pressure of 12 to 18 lbs. The water spray also serves to wash the air, having a direct drain connection. Dehumidification of humid summer air is effected by the low temperature of both the copper finned tubing and the water spray.

The refrigerating machine and water cooling tank are usually installed in some remote location, Mr. Jordan explains, cork insulation being placed around the tank and connecting cold water pipes to reduce refrigeration losses.

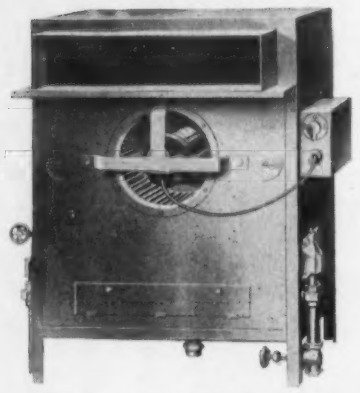
Winter functions of the machine include circulation, heating by the finned core, and humidification by the water spray. A feature of the design is that it preheats the air before washing it in order to obtain a high humidifying effect, and that it reheats the washed air by mixing it with heated air by-passed around the washing chamber. The by-pass is manually controlled, providing greatest humidification when the damper is closed all the way.

The path of air through the Zephyr includes, first, entrance through an aluminum centrifugal fan horizontally mounted in the front of the cabinet, then heating or cooling (depending on the season) in the finned core below the fan, and finally washing and humidity correction in the spray chamber, from whence the air is horizontally discharged into the room through grilles.

Fan speeds can be varied from 520 to 800 r.p.m. with the motor control.

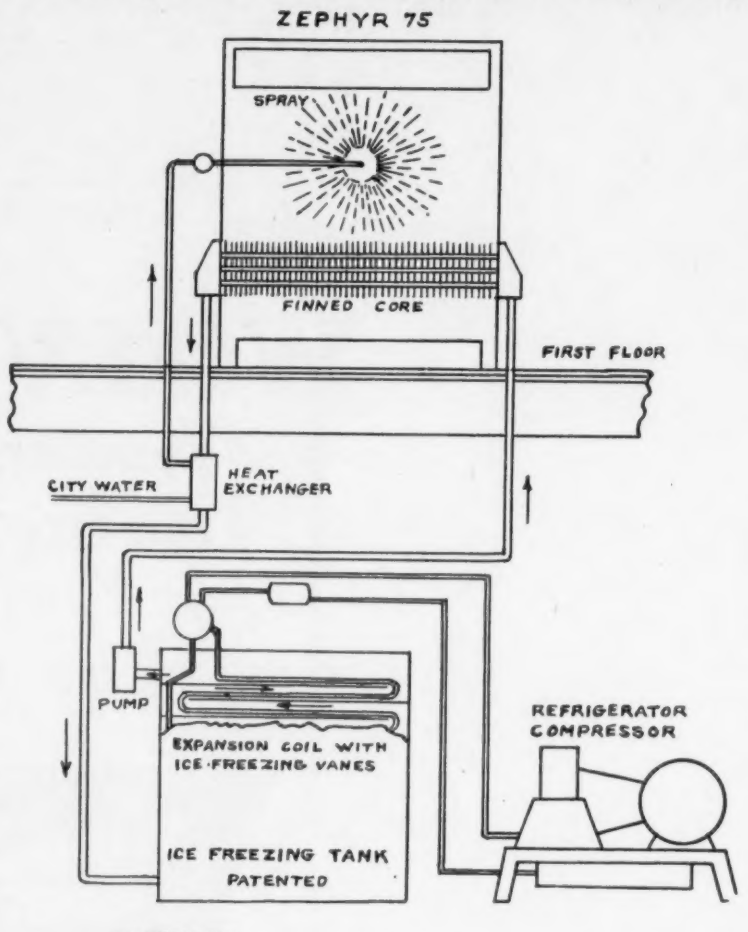
The Zephyr may also be installed in the basement as a central system, with ducts leading to the various rooms. Mr. Jordan says a number of installations have been made where the lower floors are air cooled during the day, and bedrooms are cooled at night.

Front View



Zephyr air-conditioning unit.

Storing Off-Peak Machine Capacity



Nearly 24-hour machine capacity is available by freezing ice in the tank.

FRIGIDAIRES COOLING TWO DETROIT HOMES

DETROIT—Two recent residential installations of air-conditioning systems here are those in the homes of T. D. Buhl, 71 Vendome Road, and Thomas G. Long, 1436 Chicago Blvd. Both installations were made by Frigidaire.

Sale of the air-conditioning equipment for the Buhl residence was made purely on the basis of comfort, while the Long installation was made not only because comfort was desired, but to protect the health of Mrs. Long.

The Long installation includes a floor-type cooling unit in the dining room, and an S-3 type suspended unit, concealed behind the wall of the living room.

Another floor-type unit is located in the library upstairs. In the master bedroom and guest room, and in Mrs. Long's bedroom are other S-3 units, concealed behind the walls, and introducing air into the rooms through grilles in the walls near the ceiling.

All cooling units are operated from one 3-ton condensing unit in the basement.

By means of toggle switches on both floors of the home, the cooling units in any part of the house may be cut off without going to the rooms where they are located.

In the Buhl residence, S-3 type cooling units, concealed behind the walls, are used in the library and guest room.

Two floor-type models are located in the living room, with one each in the master bedroom and sitting room.

Three 1-ton condensing units in the basement operate the system. The estimated cost of operating this equipment is 7 cents per hr.

As in the Long home, any unit in any part of the house may be turned on or off from an electrical switch in the rooms where units are located.

HUMAN PRESENCE REDUCES IONIC CONTENT OF ROOMS

CAMBRIDGE, Mass.—The entrance of human beings into a room causes a marked decrease in the ionic content of the air to a low value which remains constant until the occupants leave, according to C. P. Yaglou, assistant professor of industrial hygiene at the Harvard School of Public Health.

Mr. Yaglou's conclusions were based on experiments on the ionic content of the air in rooms with no ventilation; in rooms with window-gravity ventilation; and with air-conditioning equipment supplying the rooms.

From these tests Mr. Yaglou came to the conclusion that it makes little difference whether or not a room is ventilated—there is a definite change in the air when the room is inhabited.

He says: "It is evident that if the ionic content of the air has any beneficial effects on health, some artificial methods of ionizing the ventilating current must be employed."

One experiment showed that it is possible with artificial ionization to control both the quantity and quality of ions at any desired concentration up to 10,000 ions per c.c.

Bishop & Babcock Engineer Favors Use Of Washers in Home Conditioning

By Marion I. Levy, Air Conditioning Engineer, Bishop & Babcock Sales Co.

IT IS somewhat strange that in designing equipment for air conditioning a residence, so many departures have been attempted from the type of equipment that has been tried and proved successful for industrial and public building use.

The customary air-conditioning equipment for a theater, for example, consists of the fan, the air washer, the refrigerating equipment and the necessary duct work, and over a goodly period of years, despite the attempt to modify this arrangement, it has stood up as being most satisfactory in operation, as well as the most economical.

Air Washers for Homes

While it is conceivable that a successful air-conditioning unit may be made in small size, and radically different in design from the air-washer type equipment, it is more logical that the adaptation of a modified air washer to residence cooling will result in the most satisfactory installation.

It has been standard practice with air-washer manufacturers to provide not less than 5 gals. per 1,000 C.F.M. of water for the sprays, and every attempt to reduce this quantity has met with failure. Therefore, it is hard to believe that some of the so-called "air-conditioning units," being placed upon the market at the present time, can hope for any reasonable success using comparatively high temperature (60°) hydrant water in quantities 1/20 to 1/10 the minimum amount indicated above.

Another point that does not seem to have made the proper impression on the designers of some of these new units is the fact that an air washer should justify its name, and should not require in addition to the air washer, filters or other means of cleaning the air.

Requirements of a Washer

There are certain prime requisites in an air washer: first, the washer must be of the proper cross-sectional area so that the velocity is between 400 to 600 ft. per minute; second, the spray chamber must be long enough to provide sufficient contact between air and washer, and is seldom less than 4 ft. if the most economical use of water is desired; third, continuously flooded scrubber plates should be provided to clean the air and remove all dirt and suspended foreign substance (The scrubbers should be active at all times, and the scrubber-flooding nozzles should be independent of the spray piping); fourth, full-size eliminators must be used to remove all entrained moisture from the air as it reaches the washer. These eliminators cannot be skimped in size; whether the washer be for 2,000 ft. or 10,000 ft., the spacing depth and number of bends in the eliminator plates must be the same.

On this basis, Bishop & Babcock engineers have designed for residence use, an air washer of low cost that maintains all of the factors requisite for effective cooling. This washer, known as the residential type, has a full-length spray chamber 4 ft. long with spray nozzles so arranged that the air must pass through four highly atomized sheets of sprays.

Scrubber and Eliminator

A combination scrubber and eliminator with a continuous flooding arrangement for the scrubber is provided. The scrubber eliminator plates are placed on 1⅛-in. centers—the minimum spacing for low air resistance through the washer.

Attention to the design of the casing and tank, with frequent use of electric welding have permitted the costs to be kept within the requirements of residential installations.

In use, the washers are so arranged that the spray water is recirculated by a centrifugal pump into an ice tank, or through a sweet water bath, using mechanical refrigeration. This latter means, of course, would be recommended as it permits simple and effective control and assures proper refrigeration at all times.

GIVES SIMPLE EXPLANATION OF 'RELATIVE HUMIDITY'

DETROIT—Definitions of the terms humidity and relative humidity for the benefit of salesmen and others who will be questioned by prospective and new owners of air-conditioning plants have been formulated by Arch Black, service director of the Liquid Cooler Corp.

The simple definition of humidity is a degree of dampness. However, this is not a sufficient answer for the majority of new owners of air conditioners.

Therefore he explains: air consists principally of nitrogen, oxygen, and aqueous vapor. Between the molecules of the two gases, nitrogen and oxygen, which are the chief components of dry air, minute particles of water are floating which have risen into the atmosphere in the form of vapor.

At all times air contains some water vapor in suspension. The quantity of vapor it is capable of sustaining is entirely dependent upon the temperature. The higher the temperature the greater the capacity of the air for moisture.

When air contains its largest possible quantity of vapor it is said to be saturated. Referring this to a 0 to 100 scale, 0 representing perfectly dry air and 100 representing saturation, the quantity of moisture in the air can be expressed in figures as a percentage of the amount necessary to produce saturation, the temperature remaining the same. This proportion of moisture to saturation is known as *relative humidity*.

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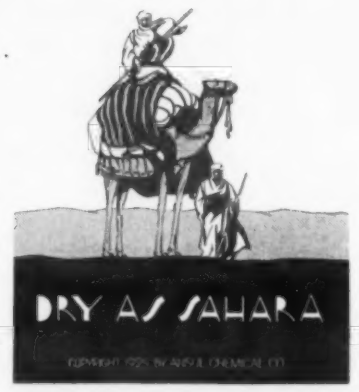

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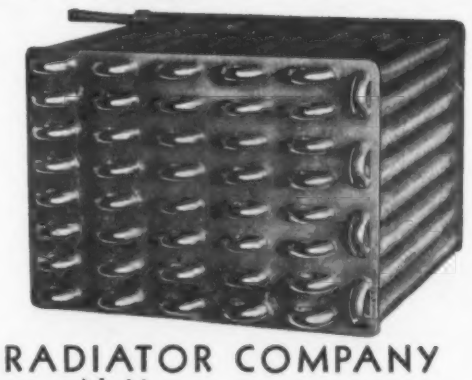

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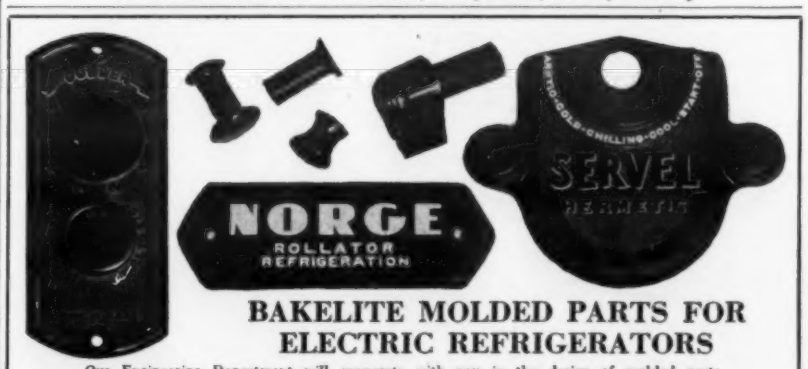

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TEST PERFORMANCE OF CARRIER COOLER

NEWARK—Performance tests on the Carrier portable room cooler, which is now being sold through electric refrigeration distributors, indicate that it will reduce the dry-bulb temperature of the air from 11 to 15° F., while the dew point of the discharged air averages from 4 to 5° less than the entering dew point.

With a 300-lb. charge of ice, the room cooler consumed an average of 60 lbs. of ice per hour over a 4½-hr. test run, or at the rate of 56.4 lbs. per hour averaged over a 5⅓-hr. period. Results of the test are plotted in the chart reproduced above.

Built into a double-thickness steel cabinet 37⅝ in. long, 24⅝ in. wide, and 52 in. high, insulated with ½ in. of pressed board, the cooling assembly holds 300 lbs. of water ice, usually supplied in four 75-lb. cakes. The cabinets are finished in walnut grain or ivory.

It may be moved from one room to another by the rubber tired wheels on which it is mounted.

In operation, the cooler takes air in from the room through a grille in the front of the cabinet about 2 ft. from the floor, and draws it between the fins of a metal grid on which the ice melts. As the ice melts down between the fins in long ridges downward-projecting "fingers" are formed, so that the air extracts heat both from the metal fins and from direct contact with the ice. Moisture from the air is condensed on the cold grids, and drains into the water reservoir in the base of the cabinet.

The cooled and dehumidified air then enters the two centrifugal fans, propelled by a 1/50-hp. motor mounted between them, and is discharged into the room through two grilles in the top of the cabinet.

An arrangement of shutters in the top grilles deflects the air in any direction into the room, and permits control of the ice-melting rate by closing one or more of the shutters.

Operating at full capacity, the cooler distributes 400 cu. ft. of air per minute. This can be reduced by means of the shutters to provide less cooling effect in cooler weather. Control of the ice-melting rate can also be accomplished by regulation of the louvres through which the room air enters in the front of the cabinet.

The cooler need not be placed in operation as soon as it is loaded with ice, Carrier engineers explain. When the fans are not running, the ice will melt at the rate of from 4 to 6 lbs. per hour.

The cooler has sufficient capacity to produce a comfortable summer condition in the average office having 300 sq. ft. of floor area, and a 10-ft. ceiling. In a larger room, or where severe sun exposure, electric lights, or equipment introduces considerable heat, more than one unit may be required, the designers explain.

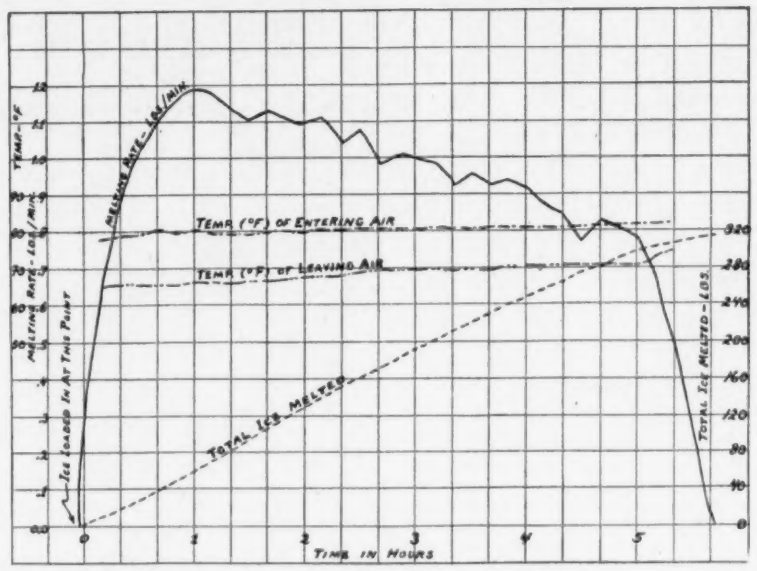
As shown in the diagram below, three methods are used to remove the water from the cabinet:

1. The tank may be drained by gravity either by wheeling the cabinet to a floor drain, or by attaching a hose to the valve and running the hose to some lower point.

2. By a water ejector which attaches to a water faucet, and will suck out the ice water by running city water through the ejector. (Carrier furnishes such a device for $3.)

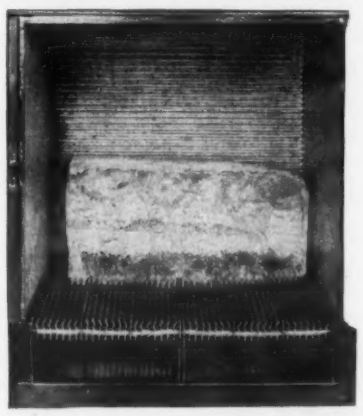
3. With a portable self-contained electric pump which will force the water meltage into any convenient wash bowl or drain.

Performance Chart


TEMP. °F
MELTING RATE - LBS./HR.
MELTING RATE - LBS./MIN.
TEMP (°F) OF ENTERING AIR
TEMP (°F) OF LEAVING AIR
ICE LOADED IN AIR THIS POINT
TOTAL ICE MELTED
TOTAL ICE MELTED - LBS.
TIME IN HOURS

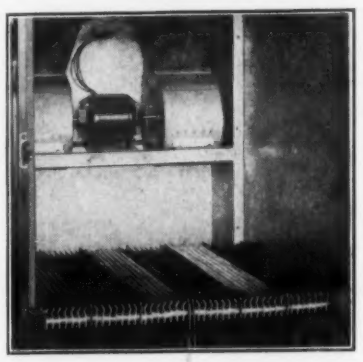
An average of 60 lbs. of ice was melted in a recent 4½-hour test of the Carrier portable room cooler.

Method of Melting Ice



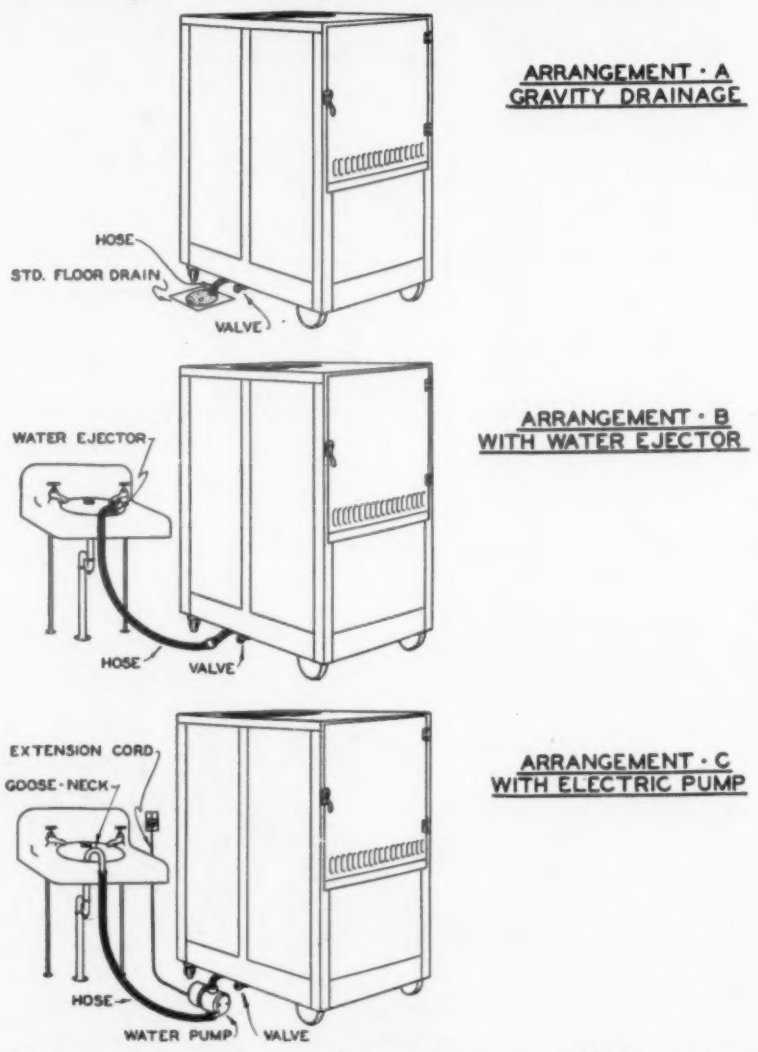
Front of partially-loaded cooler.

Interior



Rear baffle out to show fan.

3 Ways To Drain Comfort Coolers



Gravity drain, water ejector, and pump for removing melted ice water.

KORECTAIRE USES ICE IN CONDITIONING AIR

CHICAGO—Manufactured by the Watt Mfg. Co. of Sterling, Ill., Korectaire ice room coolers are now being distributed by the National Korectaire Sales Co. of Chicago. The coolers will cool, dehumidify, clean, and circulate the air. They may be used for humidification in winter.

Ice is stored in the upper sectional compartments of the unit, and when sprayed with water pumped from the water-collecting tank below, the ice water is discharged to a series of cooling trays located between the ice compartments and the water-collecting tank.

A fan in the cooler draws air from the room, passes it over the trays, and then forces it into the room again. Contact with the cold trays, part of which are wet, serves to cool and dehumidify the air. Passage across the wet trays also serves to cleanse the air to some extent.

Temperature is regulated by means of a thermostat and solenoid valve to bypass the circulated water below the ice as required. A humidistat and solenoid valve may be added for humidification purposes in winter. Heating coils may be added to the equipment when desired.

The system is available in cabinet form, or with multi-tray cooling units installed at a distance from the ice storage unit. A No. 12 cooling unit may be used in combination with a multi-tray unit, or in battery with the ice storage unit.

Equipment is also being manufactured and sold for use in combination with air furnaces. Another unit is being manufactured for cleaning, humidifying and circulating air in hatcheries, barns, etc.

RESEARCH GROUP PREDICTS SALES OF 600,000 UNITS

WASHINGTON, D. C.—In a study of the air-conditioning industry, made to determine what its demand for copper will be in the future, the Copper and Brass Research Association recently estimated that within the next five to ten years, an annual sale of 600,000 air-conditioning units will be realized.

The association estimated that 3,500,000 lbs. of copper will be used this year, and that the consumption will rise to an annual total of 35,000,000 or 45,000,000 lbs. in the next five or ten years.

The estimate is based, says the group, on the 100 per cent gain during 1931 of companies manufacturing air-conditioning units or parts, the sharp rise in the sale of small units, and the discovery that automobile-type radiators may be used effectively in cooling systems using ice as a refrigerant.

In making the prediction, a comparison with the mechanical refrigeration industry was cited which showed consumption of 1,700,000 lbs. of copper in 1924, with an increase five years later to 45,000,000 lbs.

Book Review

"REFRIGERATING DATA BOOK"
Editor: David L. Fiske. Publisher: American Society of Refrigerating Engineers, 37 W. 39th St., New York City. Price: $3.50. Pages: 659. Date of Publication: 1932.

THE refrigeration industries finally have been given a technical reference book with engineering data book on the design, construction, and operation of the numerous types of mechanical refrigerating systems. The need for such a work was evident for some time, and it has remained for the society of the refrigerating engineering fraternity to undertake the collection and publication of the data.

The book is organized into six general sections, each of which is divided into several chapters on specific phases. The sections are entitled: Fundamental Data, Principles, Refrigerating Machinery, Insulation and Containers, Refrigerating Equipment, and Applications.

Each chapter is written by a refrigerating engineer who has specialized in that particular subject. The list of chapter authors reads like a "Who's Who in Refrigerating Engineering" with such men as Baer, Birdseye, Bright, Carrier, Churchill, Edwards, Field, Frazier, Horne, Hulse, Muffly, Roberts, Stiening, Stevenson, Tait, Williams, among the 46 writers.

The various chapters treat the following subjects: Refrigerants Climatic Data, Conductivity Data, Food Properties, Thermodynamics, Psychrometry, Heat Transmission, Domestic Refrigeration, Small Commercial, Commercial, Industrial Compressors, Industrial Coolers and Condensers, Insulation, Refrigerators, Cars and Trucks, Piping, Pumps, Electric Power, Air Fans, Cooling Towers, Instruments, Air Conditioning, Cold Storage, Frozen Foods, Ice Plants, Solid Carbon Dioxide, and Dairies and Ice Cream.

Of particular interest to the small machine industry are the chapter on Domestic Refrigerating Machinery by F. H. Steining, and the pages on motors for domestic machines by W. H. Eldridge. They describe the various types of household machines, and explain functions of their respective component parts. F. C. Stewart's chapter on small commercial equipment contains much valuable data on performance and rating fractional ton machines.

The volume contains a brief of the A.S.A. Safety Code, a table of conversion factors, a glossary defining many of the technical terms encountered in refrigerating engineering, an advertisers' section, and list of society members.

PRE-COOLING BUFFALO CARS

BUFFALO—When the Pullman car Biscay went out over Lehigh Valley railroad tracks one night last week, it was the first pre-cooled car to leave a Buffalo terminal, according to Henry Martens, assistant general passenger agent.

CHAMBERS DEFINITION OF AIR CONDITIONING

By J. C. Chambers, Manager, Air Conditioning Div., Frigidaire Corp.

THE early development and success of the air-conditioning industry, I believe, depends to a great extent on giving a correct picture to the general public of what air conditioning will do, what the true cost of necessary equipment is and what the term *air conditioning* actually means.

There are two descriptions of the term.

Technical men define it this way:

1. Control of temperature—by cooling or heating.

2. Control of humidity—by dehumidification or addition of moisture.

3. Forced circulation of air without preceptible draft—by means of fans.

4. Introduction of new air either by means of ducts or through normal infiltration.

Then we have the definition of the selling man, the description that registers with the man on the street and the prospect:

Air conditioning means the provision of indoor air that is perfectly comfortable. The term doesn't bring up thoughts of heating and humidity but pictures of summer comfort, which means, of course, cooling.

The public should know what to expect of air-conditioning equipment and it should be told that so far as the greater part of the country is concerned straight cooling is not enough and that reduction in humidity is essential.

Normal body temperature is 98.6° F. Assume that room temperature is the same, and that there is no reduction in excess body temperature by means of radiation. Assume also that the air is still and no heat is lost by convection. Then assume finally that the humidity is 100 per cent and no heat is lost by evaporation.

Under these conditions, the human body would be unable to dissipate heat. The generation of heat in a *machine* without proper provision for its dissipation will result in mechanical failure or an explosion.

The constant generation of heat by the human body without dissipation of the heat would result in death. The great number of heat prostrations annually offer proof of the dangers of these conditions.

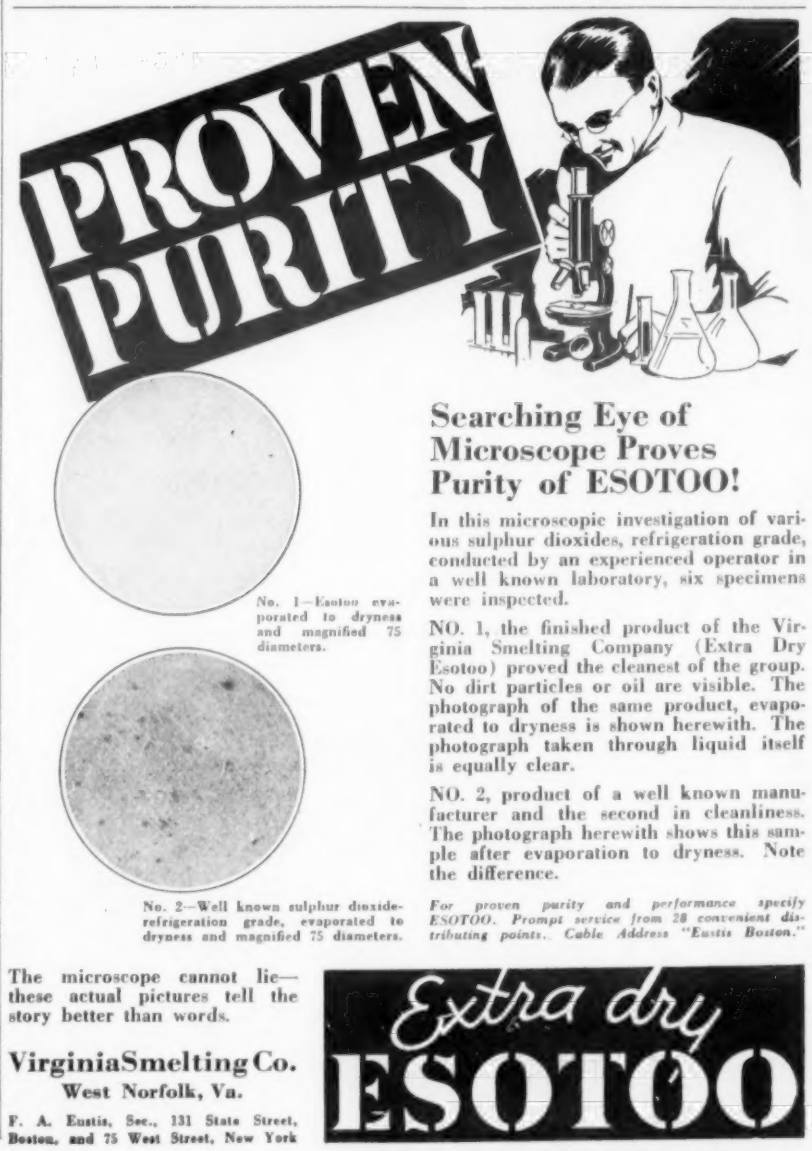
Proper summer air conditioning assists nature in utilizing all these methods of heat dissipation:

1. Reduction of temperature by mechanical refrigeration.

2. Gentle air motion by mechanical agitation.

3. Reduction in humidity by mechanical refrigeration.

It is clear, therefore, that cooling alone is not sufficient, that dehumidification alone doesn't do the job, and that air motion by itself is not air conditioning. Each is one part of air conditioning. The three together make up summer air conditioning for summer comfort, which is the problem most of us are most interested in at this time.



Searching Eye of Microscope Proves Purity of ESOTOO!

In this microscopic investigation of various sulphur dioxides, refrigeration grade, conducted by an experienced operator in a well known laboratory, six specimens were inspected.

NO. 1, the finished product of the Virginia Smelting Company (Extra Dry Esotoo) proved the cleanest of the group. No dirt particles or oil are visible. The photograph of the same product, evaporated to dryness is shown herewith. The photograph taken through liquid itself is equally clear.

NO. 2, product of a well known manufacturer and the second in cleanliness. The photograph herewith shows this sample after evaporation to dryness. Note the difference.

No. 1—Esotoo evaporated to dryness and magnified 75 diameters.

No. 2—Well known sulphur dioxide-refrigeration grade, evaporated to dryness and magnified 75 diameters.

For proven purity and performance specify ESOTOO. Prompt service from 28 convenient distributing points. Cable Address "Eustis Boston."

The microscope cannot lie—these actual pictures tell the story better than words.

VirginiaSmelting Co.
West Norfolk, Va.

F. A. Eustis, Sec., 131 State Street, Boston, and 75 West Street, New York

Extra dry ESOTOO

Special Control Devices Developed For Air-Conditioning Equipment

By D. D. Wile
Detroit Lubricator Co., Accessories Laboratory

CONTROLS for air-conditioning equipment include various circuits from the simple control of a single unit by means of a hand switch to the more complicated circuits required to control cooling, heating, and humidification. Where a single cooling unit is used, automatic control is accomplished by a wall-type thermostat arranged to start and stop the compressor and fan through a motor-starting switch. The present tendency is toward the combination cooling, heating, humidifying and air-cleaning unit.

For new buildings the entire apparatus is generally located in the basement and duct work used to distribute conditioned air to various rooms or parts of the building.

For old buildings where the existing heating system is to be continued and duct work is impractical, individual cooling units are usually installed at several desired locations.

The individual cabinets may include heating and humidifying means. Where large capacity compressors are available, it is possible to operate the various individual units from the same compressor and obtain individual control of cooling, heating, and humidification.

New Control

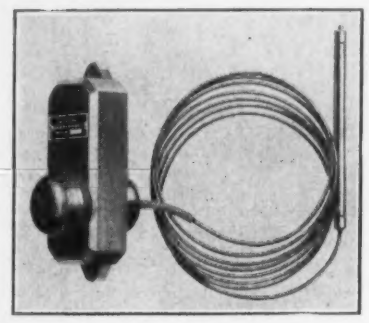


Fig. 1—Differential Thermostat.

Thermostat

The most important item in the control system is the thermostat, usually of the wall type. For installations in homes already equipped with a heating system and a thermostat, the old thermostat can be used to control both heating and cooling. A single-pole double-throw relay will generally be required to obtain this double function.

When a new thermostat is used and it is desired to control both heating and cooling by a single thermostat, it should be of the three-wire type, making one circuit at low temperature and the other circuit at high temperature.

Differential Thermostat

Tests made by the A.S.H.&V.E. research laboratory and much field experience have shown that greatest comfort is obtained by varying the inside temperature during cooling in accordance with outside temperature conditions.

Fig. 1 shows the A.S.H.&V.E. curve of desirable inside temperature for various outside temperatures. It will be noted that the need for refrigeration begins at 73° F. outside temperature. It will be seen that a 76.5° F. inside temperature is required when the outside temperature rises to 85° F.; and at 100° outside temperature, the inside temperature should be held at 81° F.

The thermostat shown in Fig. 2 has a sensitive element exposed to room temperature and also an extension bulb for exposure to outside temperature. The instrument operates on the differential principle and is designed to control inside temperature in exact accordance with the A.S.H.&V.E. curve.

The differential thermostat marks a definite advance in the control of cooling equipment. It produces comfort without the objectional over-cooling so often experienced when the cooling temperature is maintained constant without regard to outside temperature.

The differential thermostat is used to control cooling only and should be supplemented by an additional thermostat during the heating season.

Humidity Control

Sensitive and reliable humidistats are now available at reasonable cost. The humidistat is usually connected to a solenoid valve in the water line connecting to the spray nozzle or evaporating pan.

As shown in the following description of the accompanying wiring diagrams, the humidistat can be connected so that the solenoid valve cannot open during the summer time. This precaution makes the installation fool-proof in case the humidistat is tampered with.

Ordinarily humidity during the summer is much above the operating point of the humidistat. Also, it is general practice to connect the solenoid valve so that it cannot open, even during the heating season, unless the thermostat has started the heating system in operation.

This arrangement prevents the waste of water. The quantity is so small, however, that the necessity of such arrangements must not be over-emphasized.

The Summer-Winter Hand Switch

For combination heating and cooling units of the duct work or cabinet types, a single fan is generally used. It operates when the thermostat calls for heating during the winter or cooling during the summer. At the present time it is common practice to use a hand switch which is manually operated during the spring and fall to change from the winter to summer functioning of the system.

Obviously this operation can be done automatically by an outside thermostat and relays. In the case of separate heating and cooling thermostats, the winter-summer switch is unnecessary. Elimination of the winter-summer hand switch usually involves additional relays and complication that may offset the advantage gained by complete automatic operation.

Double-throw, double-pole switches are available for flush mounting and can be installed in the living quarters so that it is unnecessary to go to the basement to change from winter to summer operation. A flush switch can also be provided to effect constant operation of the fan during the summer time.

Some engineers see an advantage in operating the fan continuously during hot weather in order to obtain the cooling effect of moving air even when the thermostat does not cause operation of the refrigeration unit.

Control of Refrigerating Unit

Two methods are now in general use for controlling the refrigerating cycle: first, by allowing the thermostat to start and stop the compressor; second, by allowing the thermostat to control a solenoid valve in the liquid line and a pressure switch to operate the compressor.

Where several cooling units are operated from one compressor, the solenoid valve control is necessary. Even in single systems the solenoid valve control often proves advantageous. It prevents high pressures at the compressor crank case during shutdown periods and particularly during the winter season when heat from the heating coils may warm up the cooling coils.

It eliminates the necessity of manual operation of the liquid line shut-off valve by a service man during the spring and fall. With F-12 the solenoid valve control has further advantage in preventing absorption of gas into the crank case oil.

Particularly where the basement temperature is cooler than the air surrounding the evaporator, there is a tendency for the refrigerant to boil out of the evaporator and condense in the crank case.

The effect often produces a serious oil hammer when the compressor starts and may damage the compressor in addition to the undesirable noise produced. Considerable field experience has shown the solenoid valve control to be entirely satisfactory.

Thermostatic expansion valves should be used on room coolers controlled by solenoid valves. The pressure switch at the compressor should be set to cut out at the desired minimum pressure. A wide differential should be used between cut-in and cut-out points.

Pressure on the system is then determined by the air temperature except when the pressure reaches the cut-out point of the pressure switch. The thermostatic expansion valves keep the evaporators operating at maximum efficiency.

Clamp-on Thermostat

During the heating season it is desirable that the fan does not operate, even though the thermostat calls for heat, except when steam is on the heating coil, otherwise cool air will be circulated, which produces an uncomfortable effect.

When the thermostat calls for heat, some time may elapse before the boiler supplies steam to the heating coils. A temperature control in series with the fan attached to the return line on a two-pipe system or to the riser on a single-pipe system, will definitely prevent operation of the fan until steam reaches the heating coil.

For convenience of installation, these controls are arranged so that they can be clamped to the pipe by means of straps.

Low Voltage Circuit

Where the control circuits are connected through transformers and relays so that the voltage is 25 volts or less and the power less than 50 watts, low voltage or "bell wiring" can be used. The extra expense of relays and transformers is offset by less expensive thermostats and great saving in wiring cost. This is especially true for old buildings.

When proper types of transformers are used, the control wires can usually be installed without regard to code requirements applying to Bx. or other high-voltage wiring. These transformers must be of the "bell ringer" type that can stand short circuit continuously without damage.

Where standard type low-voltage transformers are used, the connections between transformer and solenoid valves or relays should be in approved high-voltage wiring, then use "bell wiring" up to the thermostat. Low-voltage wiring cannot be used on commercial direct current circuits. High-voltage thermostats and controls must be used throughout.

Wiring Diagrams

Fig. 3 shows a high-voltage control circuit suitable for a.c. or d.c. A single thermostat controls both heating and cooling. The fan supplies air circulation for cooling during the summer and heating during the winter.

A clamp-on thermostat prevents operation of the fan during the heating season until the boiler supplies steam to the heating coil. Where solenoid valve control is used, the solenoid can be substituted for the relay holding coil shown in the diagram or both can be used in parallel.

When the manual switch is in the winter position, the thermostat operates the fan and the heating system. With the manual switch in the summer position, the thermostat operates the fan and the compressor or solenoid valve. The control for the heating system may consist of an electrically operated gas valve for gas boilers, electric damper control or stoker motor for coal-fired boilers, or the usual oil burner control.

Fig. 4 shows a low-voltage control circuit with the same features as Fig. 3 and in addition a humidistat and solenoid valve for humidity control. Here the humidistat is independent of the heating system control and is subject to a slight waste of water as previously explained.

A separate transformer is shown for the solenoid valve and humidistat. Sev-

(Concluded on Page 15, Column 5)

Desired Inside Temperatures

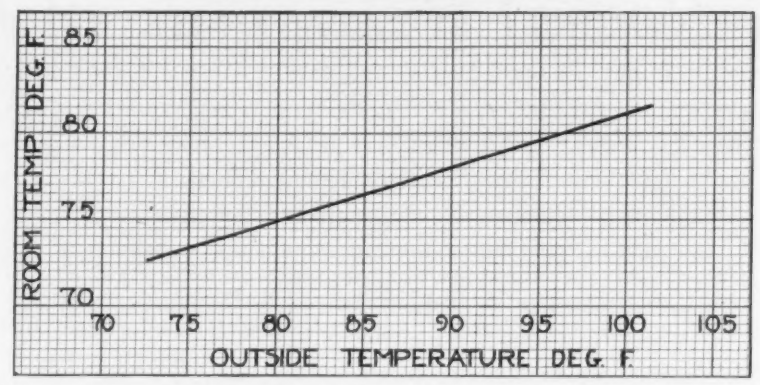


Fig. 2—A.S.H.V.E. inside-to-outside temperature differentials.

Low Voltage Control Circuit

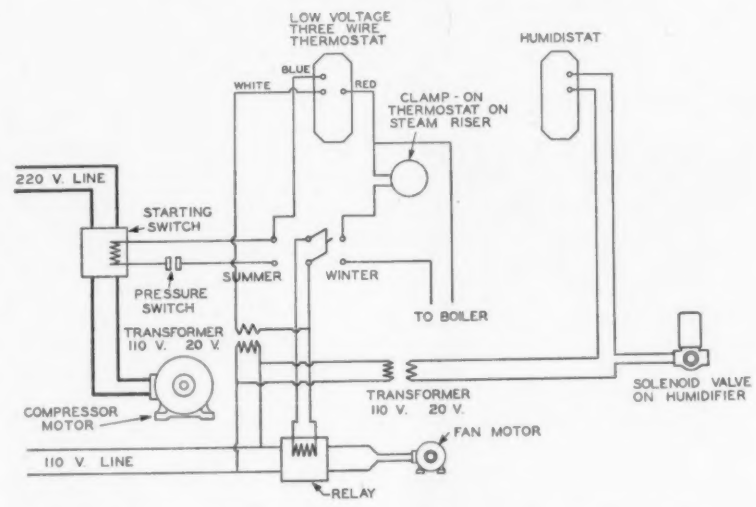


Fig. 4—Low voltage control with independent humidity regulation.

Independent Control of Air-Conditioning Functions

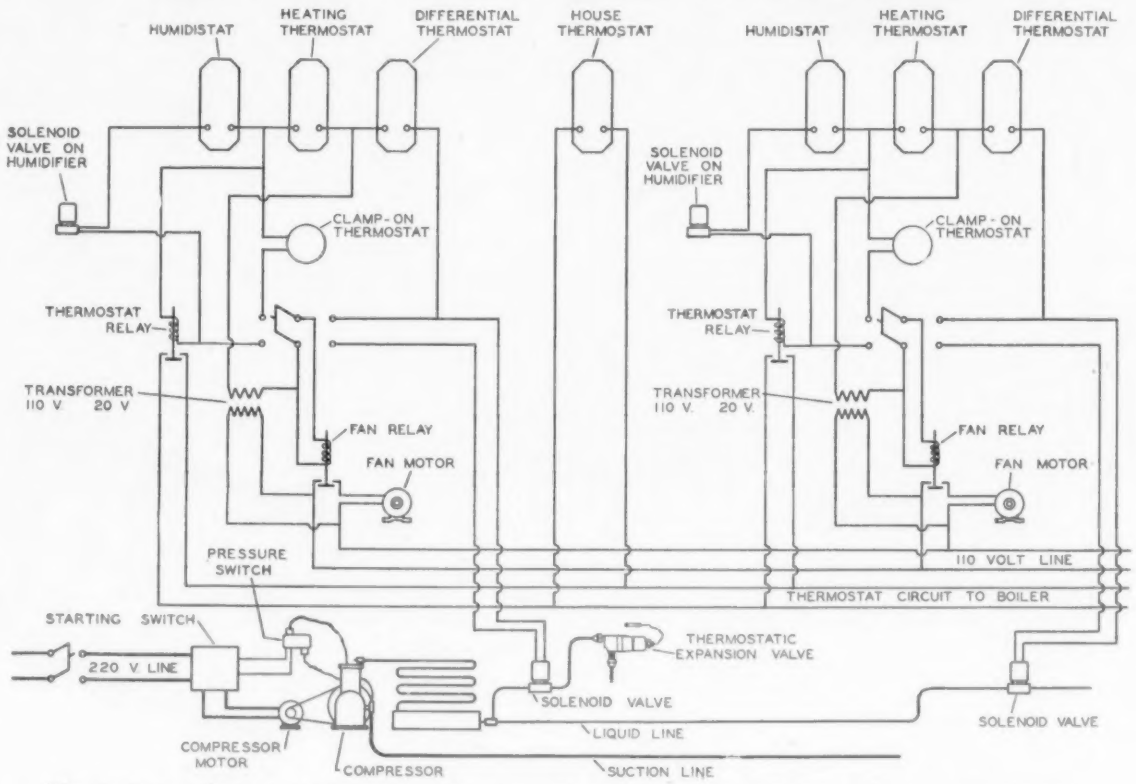


Fig. 5—Low voltage control for operating more than one cooling unit from the same compressor.

High Voltage Control Circuit

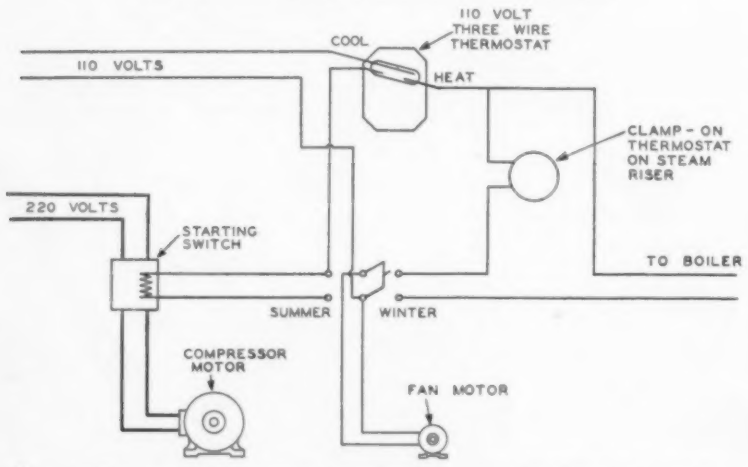


Fig. 3—Three-wire thermostat controlling both heating and cooling.

Eliminating the Manual Season Switch

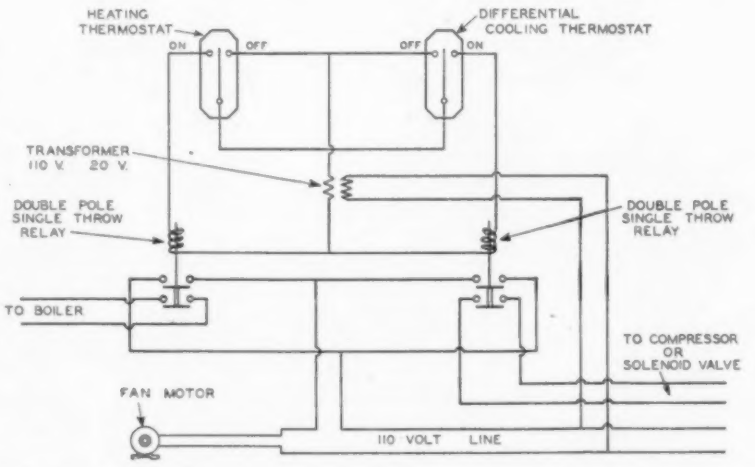


Fig. 6—Wiring diagram which eliminates a summer-winter hand switch.

Digest of Recent Refrigeration Patents

ISSUED JULY 19, 1932

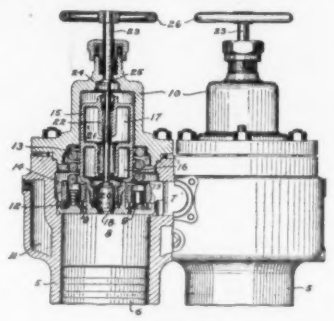
1,867,546. QUICK FREEZE TUNNEL. Alvin H. Baer, Waynesboro, Pa., assignor to Frick Co., Waynesboro, Pa., a Corporation of Pennsylvania. Filed Oct. 16, 1930. Serial No. 489,165. 6 Claims. (Cl. 257—23.)

1. A refrigerating tunnel comprising walls of insulating material, trucks movable through said tunnel, said trucks having means thereon for preventing air passing around the sides of the trucks and to cause it to pass only through predetermined channels across the trucks, said means comprising wings resiliently mounted in the frame of the truck and adapted to be pressed against the inner walls of the tunnel, substantially as set forth.

1,867,548. APPARATUS FOR CONDITIONING AIR. William J. Brocker, Tampa, Fla. Filed June 24, 1931. Serial No. 546,626. 5 Claims. (Cl. 261—9.)

1. In apparatus for conditioning air, separated vaporizing and mixing chambers, numerous U-shaped pipes extending between said chambers and having opposed legs disposed in the respective chambers, the legs in the mixing chamber converging upwardly, and means for drawing air through the mixing chamber.

1,867,681. COMPRESSOR. Adolf P. Simson, Milwaukee, Wis., assignor to The Vilter Mfg. Co., Milwaukee, Wis., a Corporation of Wisconsin. Filed July 31, 1931. Serial No. 554,259. 10 Claims. (Cl. 230—21.)



1,867,681

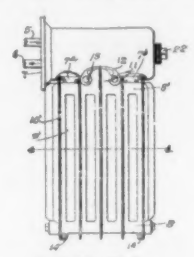
1. In combination, a cylinder, a piston movable in said cylinder to compress fluid therein, means forming a plurality of chambers, and a valve for placing one or more of said chambers in open communication with the displacement chamber of said piston and cylinder.

1,867,711. DEFROSTER. Estel C. Raney, Columbus, Ohio. Filed Jan. 2, 1932. Serial No. 584,453. 6 Claims. (Cl. 200—83.)

1. In a refrigerating defrosting device, a bellows responsive to pressure, means for resisting the expansive movement of the bellows, a switch for closing and opening a circuit upon expansion and contraction of the bellows and at predetermined pressure points, a member progressively moved upon each expansion movement of the bellows, and means for yieldingly resisting the expansion of the bellows when the last named member has been moved a predetermined number of times to increase the required switch closing pressure of the bellows.

1,867,716. REFRIGERATING APPARATUS. Franklin G. Slagel, Buffalo, N. Y., assignor, by mesne assignments, to Frigidaire Corp., a Corporation of Delaware. Filed Aug. 13, 1926. Serial No. 129,043. 10 Claims. (Cl. 62—95.)

1. In refrigerating apparatus a refrigerating element comprising a header forming a reservoir for refrigerant, and a unit,



1,867,716

forming a plurality of circulating conduits, detachably connected to the header.

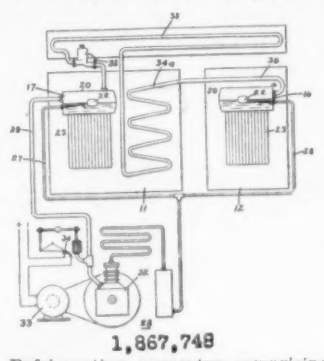
1,867,719. MOTOR OPERATED MACHINE UNIT. Harry R. Van Deventer, New York, N. Y., assignor, by mesne assignments, to Frigidaire Corp., Dayton, Ohio, a Corporation of Delaware. Filed Oct. 12, 1926. Serial No. 141,213. 5 Claims. (Cl. 62—115.)

1. The combination with a pump and a motor, of a casing therefor adapted to radiate heat therefrom, a shroud about said casing, means for causing a current of air to flow between said casing and shroud, and a condenser outside said casing connected to receive fluid from said pump and be cooled by said air current.

1,867,744. REFRIGERATING APPARATUS. Harry B. Hull, Dayton, Ohio, assignor, by mesne assignments, to Frigidaire Corp., a Corporation of Delaware. Filed Dec. 30, 1927. Serial No. 243,701. 13 Claims. (Cl. 62—99.)

1. A refrigerating element for mechanically refrigerated cabinets, comprising a coil having means for supporting substances placed thereon for congealing, and a coil disposed below said first coil for cooling the air in said cabinet, said first coil comprising convolutions of pipe disposed in a horizontal plane and said cooling coil comprising loops of pipe disposed in a vertical plane, and shielding means for directing the circulation of air over said cooling coil.

1,867,748. REFRIGERATING APPARATUS. David E. Maccabee, Dayton, Ohio, assignor to Frigidaire Corp., Dayton, Ohio, a Corporation of Delaware. Filed July 31, 1928. Serial No. 296,492. 17 Claims. (Cl. 62—115.)



1,867,748

3. Refrigerating apparatus comprising in combination a pair of evaporators connected in series, means for circulating volatile refrigerant through the evaporators and means between the evaporators for condensing, at a pressure no greater than the evaporating pressure, refrigerant issuing from the first evaporator.

1,867,749. REFRIGERATING AND VENTILATING APPARATUS. Charles A. Moore, Edina, Minn. Filed Sept. 12, 1930. Serial No. 481,426. 4 Claims. (Cl. 62—13.)

1. In combination, a train of vehicular structures, each providing a storage chamber and a compartment adjacent thereto, the chamber being in communication at its upper portion with the upper portion of the compartment and at its lower portion with the lower portion of said compartment, a unitary circulatory system within each structure, each system including an upright tank for a liquid refrigerant disposed within the compartment of its respective structure and spaced from the walls thereof and including a pipe for conveying the liquid from the lower portion of the tank along the bottom of said chamber and back to the upper portion of the tank, an air compressor carried and operated by one of the vehicular structures of the train, a storage tank for the compressed air carried by one of the vehicular structures, an air line in each structure adapted to be coupled at the ends thereof to the adjacent ends of the air lines of the adjacent structures, said air tank being connected with the air line of its respective vehicular structure, each of said unitary systems further including an air jet disposed within the liquid refrigerant conveying pipe thereof, said jet being connected with the air line of its respective vehicular structure, the air issuing from said jet causing the circulation of the liquid in said pipe, the liquid in turn washing and cooling the air, said air thereafter providing a cold freshening supply thereof for the storage chamber.

1,867,756. ROOM THERMOSTAT. Albert Penn, Des Moines, Iowa, assignor to Penn Electric Switch Co., Des Moines, Iowa, a Corporation of Iowa. Filed Feb. 24, 1930. Serial No. 430,492. 9 Claims. (Cl. 200—139.)

1. In a room thermostat, a movable contact carrying arm, a fixed contact, a thermostatic metal bar pivotally mounted and having said arm connected thereto, a control device for imparting rotary movement to said thermostatic metal bar, and a spring for resisting said control device and for holding the bar and control device in engagement.

1,867,827. MECHANICAL LINKAGE FOR CONTROL DEVICES. Malcolm E. Henning, Des Moines, Iowa, assignor to Penn Electric Switch Co., Des Moines, Iowa, a Corporation of Iowa. Original application filed Jan. 27, 1930, Serial No. 423,677. Divided and this application filed May 11, 1931. Serial No. 536,430. 7 Claims. (Cl. 74—14.)

1. In a structure of the class described, a casing, a pair of movable elements within the casing and an operative connection between said elements comprising a ball having its ends pivoted to one element and its intermediate portion contacting with one surface of the other element and means to constrain the contacting parts toward such contact.

1,867,835. HUMIDIFIER. William C. Hopson, Grand Rapids, Mich., assignor to W. C. Hopson Co., Grand Rapids, Mich. Filed Jan. 10, 1931. Serial No. 507,797. 3 Claims. (Cl. 126—313.)

1. In a humidifier, the combination of a heating unit discharge flue, a downwardly tapered reservoir wall disposed on said flue, the lower end of the wall fitting and being secured to said flue so that the flue constitutes the inner wall of an annular downwardly tapered reservoir, a conical hood having a central opening to receive said flue, and brackets on said reservoir wall supporting the lower edge of said hood in spaced relation to the upper edge of said wall, the upper edge of the hood being adjacent to but spaced from the flue to provide an annular discharge around the flue.

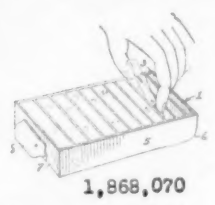
1,867,868. DRINKING WATER COOLER. Thomas O'Farrell, Laguna Beach, Calif., assignor to Sparkletts Bottled Water Corp., Los Angeles, Calif., a Corporation of Nevada. Filed Jan. 2, 1931. Serial No. 506,038. 4 Claims. (Cl. 62—154.)

1. In a cooler, a vessel, a shell spaced from and surrounding the side of said vessel to provide a cooling jacket open at the top and bottom to form a flue for passage of air, said shell having a drip lip for condensate at the top, said shell having an annular reservoir at its lower end with a hole at the center, and a coat of wick material wrapped about the side and bottom of said vessel and having a skirt with vent holes and depending into said reservoir whereby to maintain said coat saturated and subject to evaporation.

1,867,921. HUMIDIFYING APPARATUS. Joseph Alexander Mayers, Cumberland, Md.; Taylor Morrison executor of said Joseph Alexander Mayers, deceased. Filed Sept. 19, 1928. Serial No. 306,864. 5 Claims. (Cl. 126—350.)

1. A humidifier comprising in combination a closed flash boiler, means for passing water at a constant rate to said boiler, a fluid fuel burner for heating said boiler, a steam discharge pipe connected to said boiler and having its discharge end opening to the space to be humidified, and a mixing nozzle surrounding the discharge end of said pipe for mixing air from said space with the steam before its discharge into said space.

1,868,070. ICE TRAY. Edwin P. S. Newman, Washington, D. C. Filed April 29, 1931. Serial No. 533,769. 2 Claims. (Cl. 62—108.5.)



1,868,070

1. An ice tray comprising a cylindrical shaped wall, an end plate closing one end of said semi-cylindrical shaped wall and extending below the latter, a plurality of spaced semi-circular shaped partitions formed integrally with the inner faces of the semi-cylindrical shaped wall and one of the end partitions forming a closure for the other end of the semi-cylindrical shaped wall, said partitions, wall and plate cooperating to provide semi-circular shaped compartments to contain frozen blocks whereby pressure applied to any one of the blocks adjacent one edge will cause a sliding of said block within its respective compartment and position the opposite edge thereof outwardly of the compartment to be easily grasped, and side plates formed integrally with the side edges of the semi-cylindrical wall and the end plate to provide runners spaced from the semi-cylindrical wall and extending below the latter and providing a reinforcement to said semi-cylindrical wall.

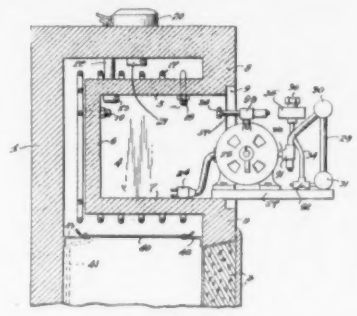
1,868,264. TEMPERATURE REGULATING AND HUMIDIFYING APPARATUS. Charles L. Whitaker, Waynesboro, Pa., assignor to Frick Co., Waynesboro, Pa., a Corporation of Pennsylvania. Filed June 17, 1927. Serial No. 199,599. 2 Claims. (Cl. 257—8.)

1. A storage chamber for fruits comprising a compartment, an air outlet from said compartment, a manually operable valve for controlling said outlet, an air inlet to said compartment, a casing in said compartment adjacent to and connected with said air inlet, air heating and air cooling means in said casing, and a fan in said casing for circulating air over said cooling and heating means, substantially as set forth.

1,868,278. AIR CONDITIONING DEVICE. William C. Denison, Cleveland Heights, Ohio. Original application filed Jan. 11, 1930, Serial No. 420,242. Divided and this application filed Aug. 30, 1930. Serial No. 479,028. 5 Claims. (Cl. 126—113.)

1. A combination heating unit and air conditioning appliance comprising a furnace having a fire box and a substantially annular air heating shell having one or more inlets for air and one or more outlets, a substantially annular air conditioning chamber encircling said heating shell and connected therewith, a substantially annular air filtering fabric disposed within said air conditioning chamber and through which the air to be conditioned must pass, means detachably securing said filtering fabric in place and a fan causing the air to be conditioned to pass therethrough, a sectional humidifying means including separate sections of fabric also disposed within said air conditioning chamber in close proximity to said filtering fabric whereby the air passing through said screen will impinge thereagainst, the humidifying fabric being of substantially the same aggregate size and shape as said filtering fabric, the said air conditioning chamber, filtering fabric and humidifying fabric being of relatively large area so that the air will be delivered therethrough at a relatively low velocity and effectively filtered and humidified.

1,868,353. ARTIFICIAL REFRIGERATING APPARATUS AND CABINET THEREFOR. Howard L. Foster, Huntington Woods, Mich. Filed Aug. 23, 1928. Serial No. 301,453. 5 Claims. (Cl. 62—116.)



1,868,353

1. In artificial refrigerating apparatus, a cabinet having a compartment for the storage of food and a fixed reentrant chamber, the exterior of which is spaced from the wall of the cabinet and the interior of which is open to atmosphere through a wall of the cabinet, an artificial refrigerating apparatus adapted for introduction into or removal from said chamber through the opening and including an electric motor and circuit therefor, a compressor, a condenser and a heat dissipating element, said cabinet being further provided with a heat absorbing element within the space between the exterior of the chamber and the cabinet walls adapted for connection with the said apparatus when positioned in said chamber, and a control switch for the motor circuit actuated through variation in temperature of the refrigerated space of the cabinet.

1,868,359. ARTIFICIAL REFRIGERATING APPARATUS. Clarence M. Holley, Highland Park, and Howard L. Foster, Detroit, Mich.; said Holley assignor to said Foster. Filed Sept. 15, 1922. Serial No. 588,325. 29 Claims. (Cl. 62—116.)

1. The combination with a refrigerator having an opening, of an artificial refrigerating unit including expansion and compression coils and apparatus for causing circulation of a refrigerant in the coils, and a heat insulating casing carrying the unit insertible through the opening and closing the opening when positioned therein, the said casing having an open end permitting circulation of air therein when the unit is in operation.

(To Be Continued in Next Issue)

D. D. WILE DESCRIBES CONTROL DIAGRAMS

(Concluded from Page 14, Column 5)

eral transformers are sometimes more convenient than one for the fact that manufacturers often supply transformers with the various low-voltage devices and they are usually large enough to handle only the load of that device.

Fig. 5 shows a low-voltage control circuit with the following features:

(a) Multiple operation of several conditioner units from one compressor.

(b) Independent cooling thermostat of the differential type.

(c) Summer-winter hand switch for operation of fan from either cooling or heating thermostat.

(d) Humidistat and solenoid valves connected so spray nozzles cannot operate unless heating thermostat so orders.

(e) Solenoid valve control on individual refrigerating units.

(f) Heating thermostats arranged to start heating system independent of existing house thermostat where it is desired to continue the use of the house thermostat at some remote location. If one of the air conditioning units is installed in the room where the house thermostat is located, then the house thermostat should be discontinued or moved to some other location.

Fig. 6 shows independent heating and cooling thermostats arranged to operate relays automatically without the necessity of a manual summer-winter switch. The thermostats are of the three-wire type, connected so that heating and cooling functions cannot occur at the same time, even though both thermostats should be in on positions.

The relays are of the small inexpensive type with double-pole, single-throw circuits. The arrangement shown in Fig. 6 can be used for multiple installations and can be tied into the existing house thermostat circuit. Obviously, humidity control can be added.

As additional refinement, an electrically operated valve can be operated on the supply line to the heating coil and thus make each unit entirely independent; in other words, one unit can be operated on the cooling cycle while another operates on the heating cycle.

Also, by using a double-throw relay in place of one of the single-throw relays, the refrigerating controls can be prevented from operating if any one of the heating thermostats starts the boiler.

In any of the above circuits a solenoid valve can be connected in parallel with the fan, and arranged to supply water to an air washer during both seasons.

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